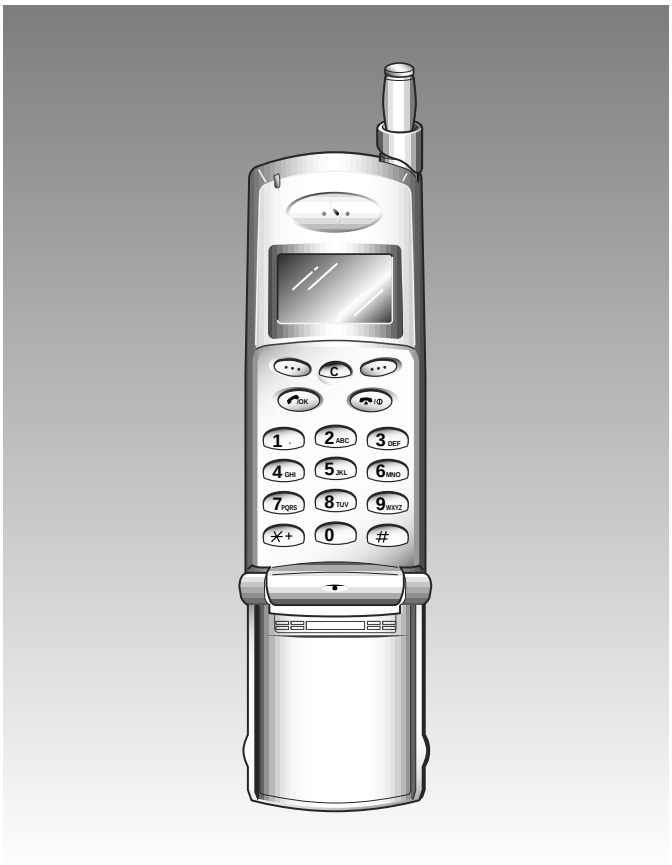
SAMSUNG

# GSM Mobile Cellular Phone

## SGH-600

# SERVICE *Manual*

**GSM Mobile Cellular Phone**



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Samsung Electronics Co.,Ltd.

# 1. General Description

## 1-1 GSM System

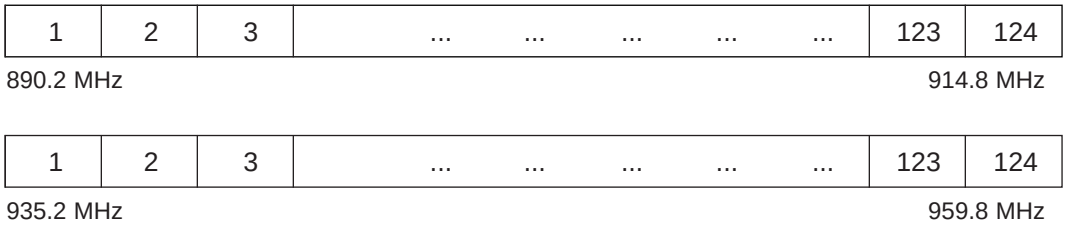
### 1-1-1 Calls

GSM® is an acronym for Global System for Mobile communications©, using TDMA for wide-area cellular operation. The GSM system consists of the sub-systems shown;
The Mobile Station (MS) talks to the Base Station System (BSS) via an RF air interface. The Base Station System (BSS) consists of Base Transceiver Station (BTS) and a Base Station Controller (BSC). The microwave link between BTS and BSC is called an Abis interface. Generally one BSC controls 20 to 30 BTSs, and a Mobile Switching Center (MSC) controlling the traffic among different cells would be reported back from a number of BSSs. A Visitor Location Register (VLR) will be allocated to one MSC to find the mobiles out of their home cell by listing them to VLR. The MSC would also be connected to the Home Location Register (HLR), the Authentication Center (AC) and the Equipment Identity Register (EIR) So the system verify that the users and equipment are legal subscriber.

### 1-1-2 Channels

Channels used in the GSM system can be divided into two classes - Logical and Physical channel. Physical channels can be described in terms of their frequency and time domain characteristics. They are the actual frequencies and timeslots the MS and BS transmits or receives on. The logical channels are mapped onto these physical channels logically. Any particular and instant, physical channels may be control or traffic channels, which determines the function of a physical channel at a particular point in time.

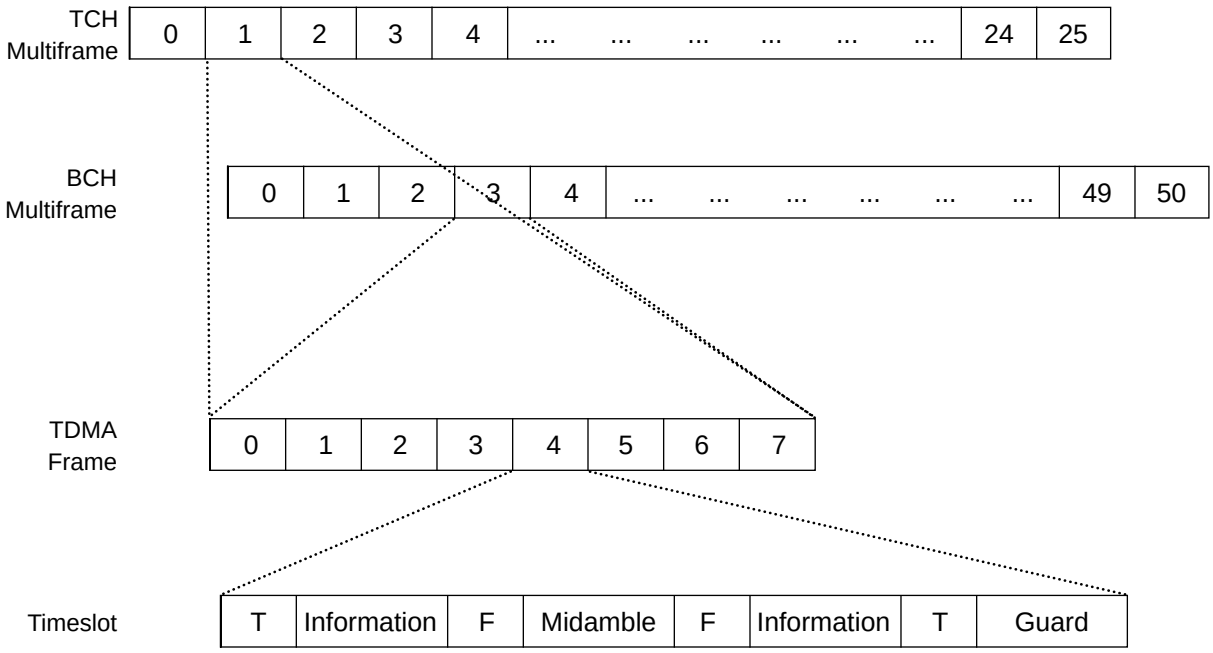
### 1-1-3 Airinterface of ARFCN (Absolute Radio Frequency Channel Number)




P-GSM: TX: Fl(n) = 890 + 0.2*n (1≤n≤124)
RX: Fu(n) = Fl(n) + 45

< Fig. 1 ARFCN Diagram >

## 1-1-4 GSM TDMA Timeslots, Frames, and Multiframes




< Fig. 2 Concept of Frames and Timeslots >

## 1-1-5 Logical Channel

TCH (Traffic CH) is used mainly for transferring the speech information, and the BCH (Broadcast CH) is related to control information.The major function of BCH is transferring information on the downlink for MS synchronization, identification, paging, and controll. BCH is always radiated from every cells and the MS tries to find the BCH which has highest level soon after turned on. The organization of BCH is shown belows; FCCH (Frequency Correction Channel), SCH (Synchronization Channel), and BCCH (Broadcast Control Channel). CCCH (Common Control Channel) will play a role like a message board, and is divided into two control channels - PCH (Paging Channel) and AGCH (Access Grant Channel). SACCH (Slow Associated Control Channel) exists every 12 frames, controlling and controls the TX power level and timing advance of MS, transferring cell information to MS on downlink, transferring the information about RX level, Quality, and RX level of adjacent cell on uplink. FACCH (Fast Associated Control Channel) steals and changes the TCH when needing a Handover. SDCCH (Stand-alone Dedicated Control Channel) and RACH (Random Access Channel) operate during the call setup procedure.

# 1-2 GSM HHP Feature

## 1-2-1 Main Set (HHP)

The main set is a microprocessor (KERNEL5)-controlled, full duplex radiotelephone system that provides the user with GSM cellular service through cell sites linked to control centers.
It also provides functions related to frequency control, power control, and many user-convenience feactures.

## 1-2-2 Desktop Charger

The DTC is designed to charge batteries from commercial mains. The charger has two battery receptacles. The forward one is for rapid charging, and the rear for normal charging.

## 1-2-3 Travel Adaptor

The travel adaptor  is designed to operate the main set by supplying power to directly, while charging batteries from commercial mains.

## 1-2-4 Cigar Lighter Adaptor

A cigar lighter adaptor is used to operate the main set and charger the battery from a 12 volt vehicular electrical system.

## 1-2-5 Hands Free Car Kit

The Hands Free kit provides unlimited talk time, as power is supplied by the vehicular electrical system, and improved receiving and transmitting due to the external antenna.
The Hands Free car kit adapts an external speaker, a hands-free microphone, a bracket, and a cradle for mounting the main set. ®Hands Free© means user can have a conversation without holding the phone by hand.

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# 3. Specification

## 3-1 General Specification

### 3-1-1 Frequency Range

- Transmit (Uplink): 890 ~ 915 MHz
- Receive (Downlink): 935 ~ 960 MHz

### 3-1-2 Channel Spacing : 200 kHz

### 3-1-3 Number of Channels: 124

### 3-1-4 Frequency Spacing: 45 MHz

### 3-1-5 Modulation Data Rate

- 270.833 kbits/sec

### 3-1-6 Frame Period: 4.615 msec

### 3-1-7 Timeslot Period: 576.9 μsec

### 3-1-8 Modulation Type: 0.3 GMSK

### 3-1-9 MS Max Power: 2 W (33 dBm)

### 3-1-10 MS Min Power: 0.3 W (5 dBm)

### 3-1-11 Voice Coder Bit Rate: 13 kbits/sec

### 3-1-12 Input / Output Impedance : 50Ω

### 3-1-13 VCO Frequency

- TX VCO : 890 ~ 915 MHz,
- UHF VCO : 1160 ~ 1185 MHz
- VHF VCO : 540 MHz

### 3-1-14 IF

- 1st RX IF: 225 MHz
- 2nd RX IF: 45 MHz
- 1st TX IF: 270 MHz

### 3-1-15 VCTCXO Frequency

- 13 MHz (±5 PPM)

### 3-1-16 Operating Temperature

- Main : Nominal: +15 ºC ~ +35 ºC
  Extreme: -10 ºC (spec) ~ +55 ºC

- TA : Nominal: +15 ºC ~+35 ºC
  Extreme: -20 ºC ~ +55 ºC

### 3-1-17 Operating Voltage

- High Voltage: 4.1 V
- Nominal Voltage: 3.7 V
- Low Voltage: 3.4 V

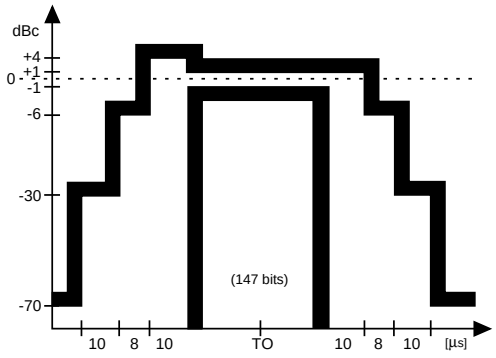
# 3-2 Transmitter Specification

## 3-2-1 Power

| Power Control Level | Peak Power (dBm) | Norminal (dB) | Extreme (dB) |
|---|---|---|---|
| 5 | 33 | ±2 dB | ±2.5 dB |
| 6 | 31 | ±3 dB | ±4 dB |
| 7 | 29 | ±3 dB | ±4 dB |
| 8 | 27 | ±3 dB | ±4 dB |
| 9 | 25 | ±3 dB | ±4 dB |
| 10 | 23 | ±3 dB | ±4 dB |
| 11 | 21 | ±3 dB | ±4 dB |
| 12 | 19 | ±3 dB | ±4 dB |
| 13 | 17 | ±3 dB | ±4 dB |
| 14 | 15 | ±3 dB | ±4 dB |
| 15 | 13 | ±3 dB | ±4 dB |
| 16 | 11 | ±5 dB | ±6 dB |
| 17 | 9 | ±5 dB | ±6 dB |
| 18 | 7 | ±5 dB | ±6 dB |
| 19 | 5 | ±5 dB | ±6 dB |

The power-time template requirements for mobile stations also apply to base stations. The only difference is that, in the base station case, no short burst (random access) exists. To measure the template, the base station has to be operated in its *bursting mode*. This test cannot be performed on the base channel, since a base station has to transmit continuously in all time slots. In most cases, an additional channel besides the base channel has to be activated or the transmitter under test is not considered to be configured as a base channel transmitter. The average peak power from the previous part of the test is used as a reference. The time reference is provided by the training sequence in the middle of the burst. The template has to meet the requirements of Fig. 6. Again, the noise level of -70 dBc is dependent on the actual transmitted power level. If this level is below -36 dBm, the absolute level applies. The template is usually evaluated along with the peak power level.

## 3-2-2 Power Ramping Time Level




< Fig. 6 Power-Time Template >

## 3-2-3 IF Filter

- 270 MHz LC Filter

## 3-2-4 TX SAW Filter

- Spurious signal atenuating : ≤-70 dBc
- Wide Bandwidth to make plane Group delay characteristic

## 3-2-5 Power Amplifier

- Total Efficiency: 40~45 % at Pin=1mW,
  $V_{DD}$=3.6 V, Pout=3.2 W

# 3-3 Synthesizer Specification

## 3-3-1 General Specification

- Frequency Hopping : 1 Channel to < 3° rms in < 500 mS
- Phase Noise: < 3° RMS

## 3-3-2 IF Synthesiser

- Synthesizer Frequency: 540 MHz
- Output Signal Drive Level: -10 dB
- 2nd IF LO Output Frequency FIR: 45 MHz

## 3-3-3 FIR Output

- 1st IF: 225 MHz
- 2nd IF: 45 MHz
- FIR Frequency: 45 MHz
- FIR Level: -17 dBm

## 3-3-4 Phase Noise Specification

| Offset (kHz) | Phase Noise (dBc/Hz) |
|---|---|
| ± 200 | < -75 |
| ± 250 | < -78 |
| ± 400 | < -105 |
| > 600 | < -105 |
| > 1200 | < -105 |
| > 1800 | < -113 |
| > 3000 | < -115 |
| > 6000 | < -121 |
| > 10.0 MHz | < -124 |
| > 20.0 MHz | < -129 |
| > 30.0 MHz | < -134 |

# 3-4 Receiver Specification

## 3-4-1 Front-end Specification

- Input Frequency range: 935 MHz ~ 960 MHz
- Gain: 18 dB
- If Frequency range: 540 MHz
- Input Impedance: 150 Ω
- Output Load: 1 kΩ
- Overall Sensitivity: -106 dBm for 9 dB S/N in 180 kHz

## 3-4-2 Sensitivity

- Reference Sensitivity Level: -102 dBm
- Channel Width : 180 kHz
- Input Thermal Noise: -121.4 dBm/Hz
- Ouput S/N: > 9 dB
- Noise Figure: < 7 dB

## 3-4-3 Intermodulation

- Input Useful Signal: -99 dBm
- Interferer: -49 dBm at ± 800 kHz and 1600 kHz

## 3-4-4 Selectivity

| Signal | Type | Level |
|---|---|---|
| Useful Signal | GMSK | - 82 dBm |
| Cochannel | GMSK | - 9 dBc |
| ± 200 kHz | GMSK | + 9 dBc |
| ± 400 kHz | GMSK | + 41 dBc |
| ± 600 kHz | GMSK | + 49 dBc |

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# 2. Circuit Description

## 2-1 RF Part

### 2-1-1 Frequency Generator

The 13MHz reference clock (VCTCXO) drives the logic and RF part. The 13 MHz reference is controlled by the logic (10bits DAC minimum) and is kept to a frequency error less than ±0.1 ppm after synchronization with the GSM network.
A 540 MHz oscillator is divided by 2 to generate a fixed 270 MHz VHF LO used in the TX I,Q modulator and mixed by 270 MHz. The UHF LO for the first RX down conversion and the TX offset mixing works in superheterodyne mode to reduce the relative bandwidth and to be able to work at a frequency greater than 1 GHz.

### 2-1-2 Transmitter

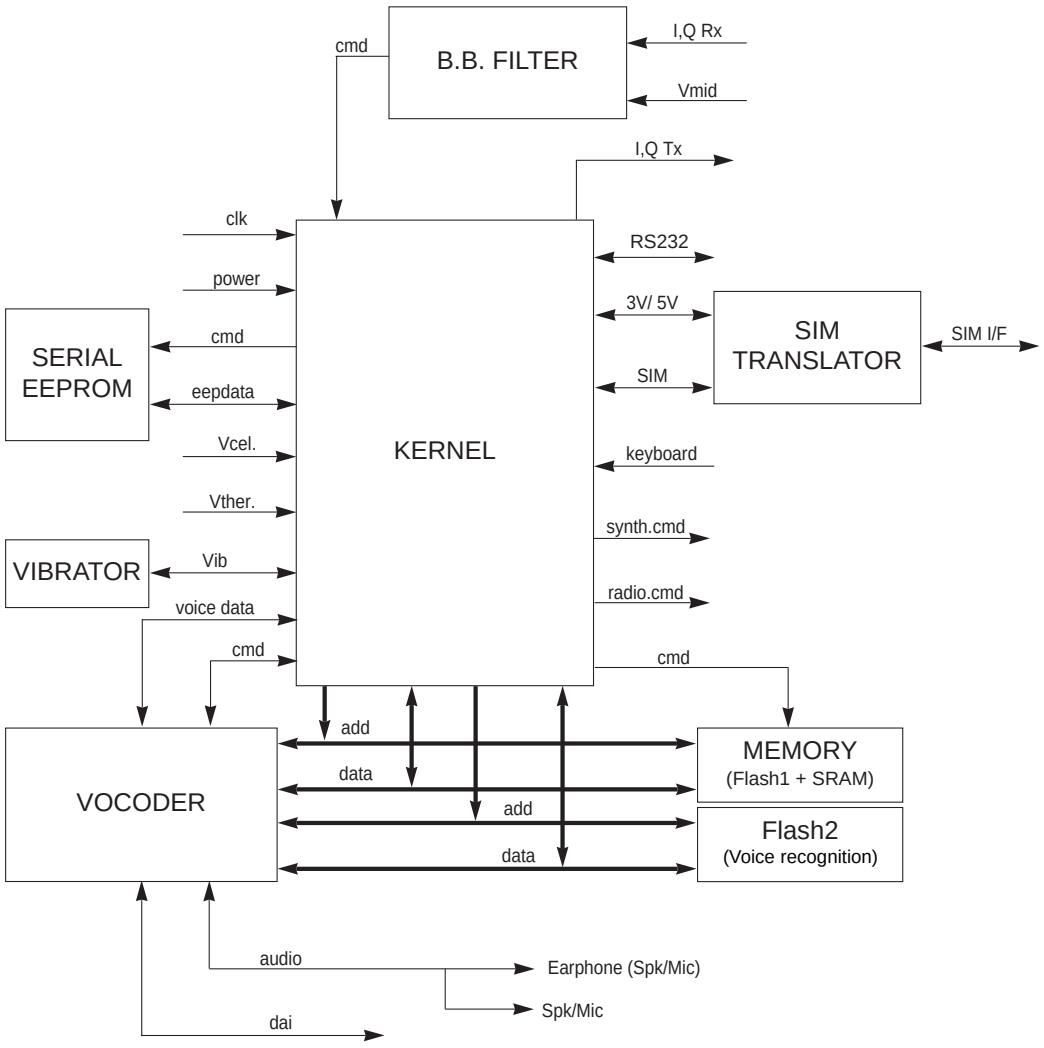
The baseband GSM chipset (Kernel5) generates I and Q baseband signals for the transmit vector modulator. The modulator provides more than 40dBc of carrier and unwanted side-band rejection and produces GMSK modulated signal, the 'reference' signal at 270 MHz which passes to the offset phase-locked loop block (OPLL). The OPLL consists of a down-converter, phase detector, loop filter and transmit VCO operating at the final RF output frequency. The down converter mixes the UHF LO (eg. 1172 MHz) with the transmit VCO signal to generate a 'feedback' signal at 270 MHz. The 'feedback' signal passes via a limiter to one port of the phase detector. The GMSK 'reference' signal from the vector modulator passes via a second limiter to the other input port of the phase detector. The phase detector generates an error current proportional to the phase difference between the 'feedback' signal from the down-converter and the 'reference' signal from the vector modulator. This error current is filtered by a second order low-pass filter to generate an output voltage which depends on the GMSK modulation and the desired channel frequency. This voltage controls the transmit VCO such that the VCO output signal, centered on the correct RF channel, is frequency modulated with the original GMSK data. The centre frequency of the transmit VCO is offset from the UHF LO frequency by 270 MHz. The OPLL acts as a tracking narrowband band pass filter tuned to the desired channel frequency. This reduces the wideband noise floor of the modulation and up-conversion process and provides significant filtering of spurious products. The OPLL architecture results in a low-noise GMSK modulated signal at 902 MHz with very low spurious content.
The RF GMSK output from the transmit VCO is fed via TX SAW filter to the RF power amplifier. The peak output power and the profile of the transmitted burst are controlled by means of a closed feedback loop. The RF output from the PA is sampled with a directional coupler. The sampled signal passes to an RF detector diode whose output voltage is dependent on the incident RF level. This 'feedback' voltage passes to the inverting input of the loop integrator. A 'reference' signal is generated within the baseband section under control of the layer 1 software. The loop maintains zero difference between the 'feedback' signal and the 'reference' signal. In this way, the amplitude and shape of the transmitted RF burst may be controlled by the baseband processor. In particular, the rise and fall profiles can be controlled to meet the stringent power/time templates and switching transient requirements of GSM 05.05.
The RF output passes to the antenna connector via an integrated TX/RX switch and lowpass filter to attenuate the harmonics generated by the power amplifier.

### 2-1-3 Receiver

The incoming RF signal passes through the integrated lowpass filter and TX/RX switch. This is followed by a 947 MHz SAW Band Pass Filter and a bipolar low-noise amplifier (LNA). The HD155101BF includes an active bias circuit which stabilizes the DC operating point of the LNA. The RF signal passes via a second RF SAW filter to the first receive mixer. This mixer is implemented as a Gilbert cell within the HD155101BF. The incoming signal at 947 MHz mixes with the UHF LO at 1172 MHz to generate a 225 MHz IF signal. The IF signal passes from the mixer output via a 225 MHz IF SAW filter to the first IF amplifier. A further internal Gilbert cell mixes the 225 MHz IF signal down to the 45 MHz second IF. The 45 MHz output from the second mixer is filtered and passes to the AGC amplifier. The gain of the AGC amplifier is set by a DC control voltage supplied by the baseband. The usable control range is in excess of 80dB. Finally, the AGC output signal at 45 MHz passes to the demodulator and is mixed down to DC to generate I and Q baseband signals. The baseband signals pass via baseband filter to the baseband A/D converters. The remainder of the channel filtering is performed by the baseband chipset.

## 2-2 Baseband Part

### 2-2-1 General Block Diagram




< Fig. 3 Baseband Block Diagram >

### 2-2-2 ROM1 & SRAM

8M (X16) Flash ROM and 2M (X8) bit SRAM are used. Two devices are merged in one package. This device is a combination memory organized as 524, 288 x 16 bit flash memory and 262, 144 x 8 bit static RAM in one package.

### 2-2-3 ROM2

A 8M (X16) bit Flash Memory is used for the voice recognition and voice memory. This device is an 8, 388, 608 bit flash memory with batch chip erasing, sector erasing, and byte and word writing using a single 3V power supply.

### 2-2-4 EEPROM

The kernel requires some external non-volatile memory to store various system parameters, such as RF control calibrations, extra dial stores etc. A 64 K (65, 536) bit device is used. This device is internally organized 8192 x 8. This device features a serial interface and software protocol allowing, operation on a simple, two wire bus.

## 2-3 SIM

### 2-3-1 SIM Interface

An interface is provided to a serial port controlling the SIM interface. It can support 5V and 3V SIM interface. The hardware interface consists of SIMVCC, SIMdata I/O, SIMclk output, SIMRST output, and SIMPRES input. The interface is controlled through TX Data, RX Data, control, and status registers. Transmit and receive data may use a 256 byte buffer or be exchanged through single byte registers. SIMVCC may be used to control the power supply to the SIM card.

# 2-4 POWER MANAGEMENT

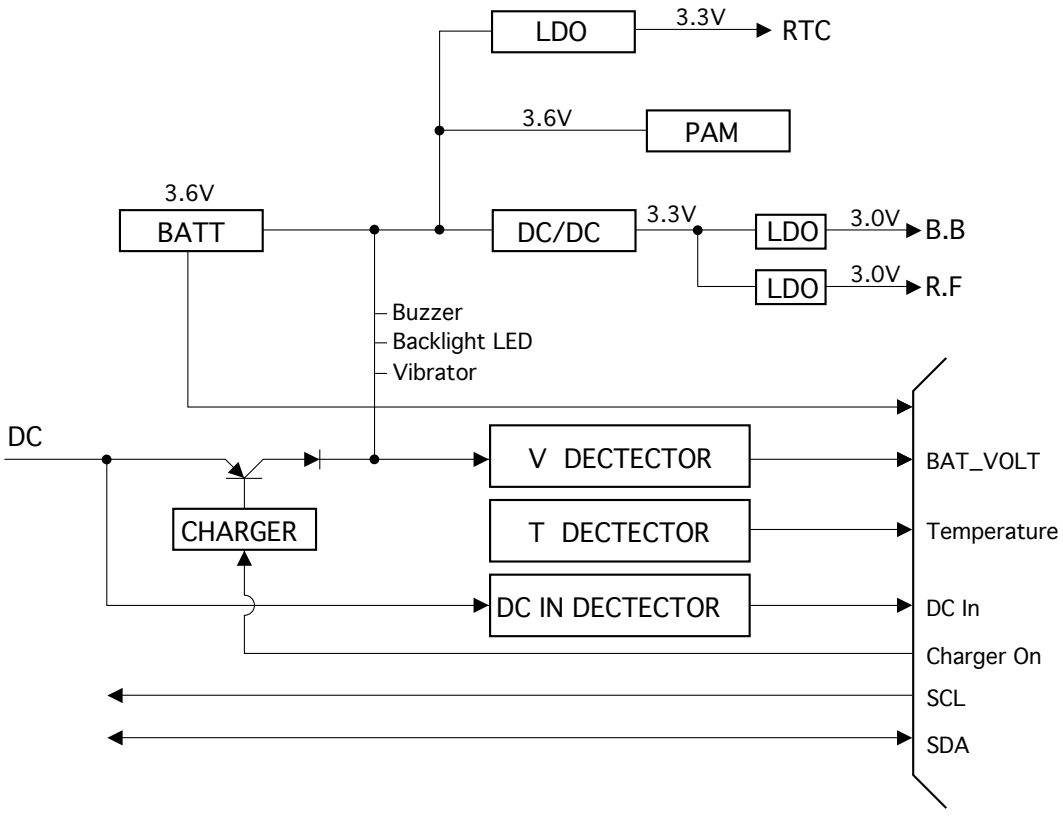
## 2-4-1 DC/DC Converter

Our 1 cell Li-ion battery solution requires a up-converting DC/DC conversion circuit for efficiency improvement. The device is a PWM Step-up DC/DC converter IC. Specification is as below;

- Vin: 2.75 V ~ 4.2 V
- Vout: 3.3 V ~ 4.1 V
- Ripple: less than 50 mVpp
- Efficiency: typ. 85 % (up to 96%)

## 2-4-2 Charger Circuitry

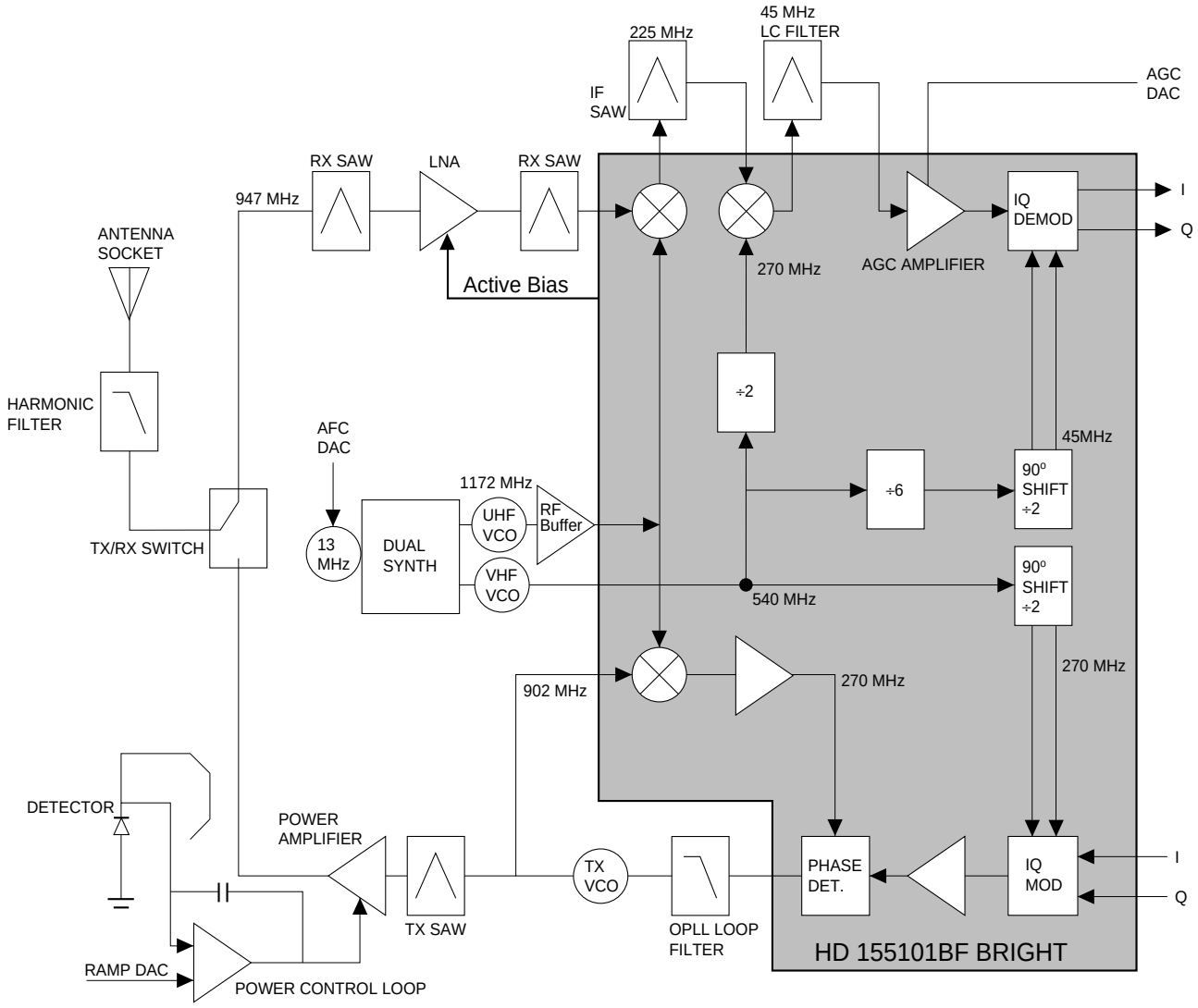
The simplified built-in charger circuit diagram is as below ;




< Fig. 4 Built-in Charger Circuitry >

# 2-5 RADIO INTERFACE

## 2-5-1 RF Block Diagram




< Fig. 5 RF Block Diagram >

## 2-5-2 Baseband Filter

To control the spectral splatter and thus the intersymbol interference (ISI), filtering is applied to the baseband pulses. The required filtering achieved very simply using a small, low cost discrete LC structure, which has the great advantage of not consuming current.

# 2-6 AUDIO

## 2-6-1 Audio Inputs

The Handset provides two audio inputs:
• Built in microphone
• Connection for external microphone

A microphone biasing amplifier reduces component count in the overall system design:
• Supply: 2.2 V regulated to ±20 %
• Different output to eliminate possible coupling noise problems, MICBIASP and MICBIASN
• Maximum current: 500 uA
• Maximum load: 200 pF

# 2-7 EXTERNAL INTERFACE

A 18 pin connector is mounted on the bottom corner of the PCB. The antenna external connection is on the right hand side of this connector.

# 2-8 KERNEL SPECIFICATION

## 2-8-1 FEATURES

• Complete Layer 1 support
• TDMA burst building (ETSI Rec.5-02)
• Coding and interleaving (Rec. 5-03)
• GMSK with differential coding (Rec. 5-04)
• Programmable power template for Tx burst control
• AGC in Receive mode
• I,Q inputs or single intermediate frequency (IF) input
• Detection of FCCH, SCH, Normal and Dummy Bursts
• Flash ROM programming abilities
• Auxiliary ADC for battery voltage and temperature monitoring

### 2-8-2 Equalizer

MAJOR FEATURES

- Frequency Correction Burst Correction
- Frequency Correction Burst Frequency Measurement
- Synchronization Burst Long Preamble Correlation
- Normal Burst Short Preamble Correlation
- Channel Impulse Response Generation
- Possible Received Value Generation
- Data Equalization
- Carrier Power Measurement
- Doppler Shift Measurement and Correction
- Scaled 7-Bit Soft Decision
- I and Q component recovered from Received Data

## 2-9 VOCODER SPECIFICATION

### 2-9-1 FEATURE

- Complete GSM voice encoding and decoding functions
- DTX function
- Voice Activity Detection (VAD) output
- Fully asynchronous coding and decoding
- A-law PCM conversion
- DTMF generation
- Sidetone level control
- Programmable microphone amplifier with two differential input ports
- Two programmable audio output amplifiers
- 13 MHz master clock

# 2-10 Desk Top Charger

## 2-10-1 Charging

The desk-top charger contains switching regulator to charge a lithium battery from an DC/DC adaptor. The battery type is detected at pin 15 (MPU) through U5 ( front port) and U26 (rear port). Battery charging current is turned into Vi. Vi is measured at pin 12 (MPU) after R32 and C23 to cancel the noise. When the battery voltage is too low, the charging circuit turns to trickle mode using Q9 and Q11.

## 2-10-2 Control Part

This circuit contains 4-bit micro controller (U21), including an I/O port, timer, A/D converter to control battery charging. This circuit uses a 4 MHz main clock and +5V power.

### BATTERY VOLTAGE DETECTION

Battery voltage from the front port is detected at R20, R18 and measured at pin 13 (MPU).
Battery voltage from the rear port is detected at R14, R13 and measured at pin 14 (MPU).

### BATTERY TEMPERATURE DETECTION

The charger always detects the battery temperature via NTC thermistor to prevent battery thermal problems. This circuit is composed of parallel resistors because NTC thermistor has log-scale thermal characteristics. If the battery temperature exceeds 55 degrees C, charging stops.

### AUTONOMOUS TIMER

If MPU has stopped charging and the timer goes to the ‘on’ state by an external shock, overcharging may occur. A timer (U7-4) prevents the battery from being overcharged by any unexpected external influence.

# 2-11 Cigar Lighter Adaptor (CLA)

## 2-11-1 General Description

The CLA is a regulated switched-mode power supply designed for use with a portable HHP. The power supply is connected directly to the phone and provides a voltage path for charging a battery installed in the hand-held portable phone.

## 2-11-2 Circuit Description

The input voltage range of CLA is from 12 Vdc to 30 Vdc, and the nominal voltage is 13.7 Vdc. The output current is 600 mA. The ripple and noise amplitude is less than 50 mV at the input (12 V ~ 30 Vdc). And the limit settings are shown below;

- Current limit : 600 mA ± 50 mA at nominal input 13.7 V
- Output voltage : 9.0 V (+/- 0.8 V) Vdc at no load.

In addition, the temperature limit is -20 upto +85 ºC for storage, and 0 to +40 ºC for operating. The CLA size of SGH-600 is 89.3 x 43 x 27 mm, and the weight is 110 g.

# 2-12 Travel Adaptor (TA)

## 2-12-1 General Description

This adaptor is designed for use with a portable hand held phone (HHP). It is a switching-mode power supply connected directly to the phone with a cable, and it provides a voltage for charging a battery installed in the hand held portable phone.

## 2-12-2 Circuit Description

The input voltage range is 85 ~ 264 Vac, and input frequency is 47 ~ 63 Hz. At an input voltage of 230 Vac (standard input voltage), AC input current is 0.1 A(rms). The output voltage range is 9.0 V ± 10% and the unit maintains current 600 mA ± 30 mA. The operating temperature is 0 ~ 55 ºC, and for storage -20 ~ 85ºC. Power ON/OFF cycle is 1.0sec min. The overall size is 74.1 x 28.4 x 79.8 mm and the weight is 65 g without the output DC cable. The charger is an AC/DC switch mode flyback converter featuring constant current and voltage limit. Output cable is two-way DC cable. Maximum output power is 6.4 W.

# 2-13 Hands Free Car kit

## 2-13-1 General Description

Many states and countries are considering legislation requiring mobile phone users to operate in Hands-Free mode while driving.

Feature of the hands free kit are:
- Power adaptor (600 mA) from vehicle battery to GSM battery pack.
- Ignition sensor for automatic power ON/OFF.
- Car stereo mute function in Hands-Free mode, with programmable output level.
- External microphone input.
- Loudspeaker output.
- Hands-Free operation.

## 2-13-2 Circuit Description

The input voltage range is from 12V dc to 28V dc, (battery) and input current is 10mA(stanby). The operating temperature is -10 ~ 60 °C, and for storage temperature is - 30 ~ 85 °C(± 5 °C). The charging voltage is DC9V and charging current is MAX 600mA.

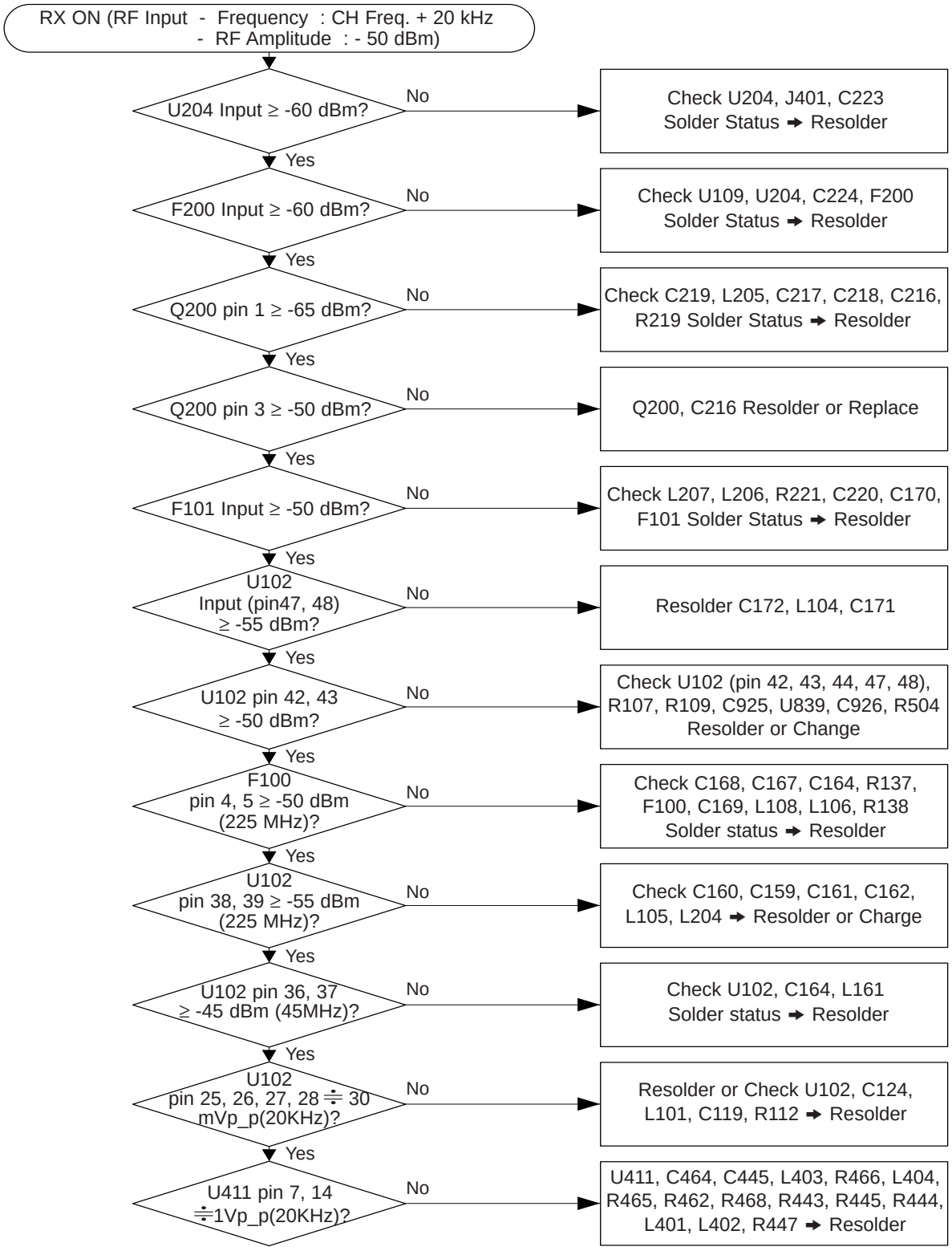
## 2-13-3 Audio Features

- Microphone Sensitivity: -60 dB ± 3 dB
- Speaker S/N: -45 dB ± 3 dB (1W Output)
- Speaker Distortion: 20% below (3W Output)
- Speaker Feature: Impedance 4Ω, Max 5W Output
- Echo Cancellation: 50 dB (Min)
- Noise Suppression: 15 dB (Min)

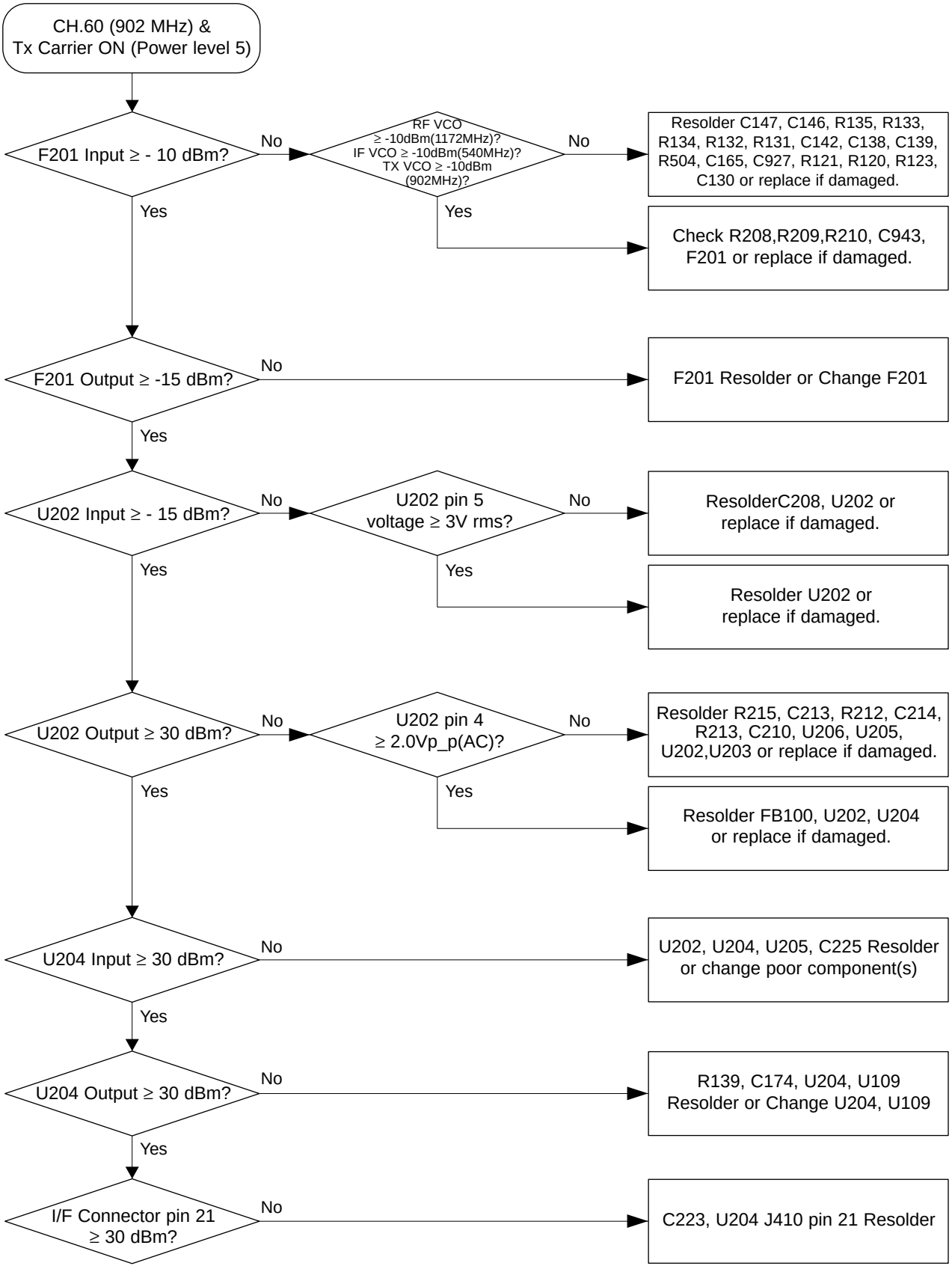
# 5. Troubleshooting

## 5-1 Main Set

### 5-1-1 RX Sensitivity Problem

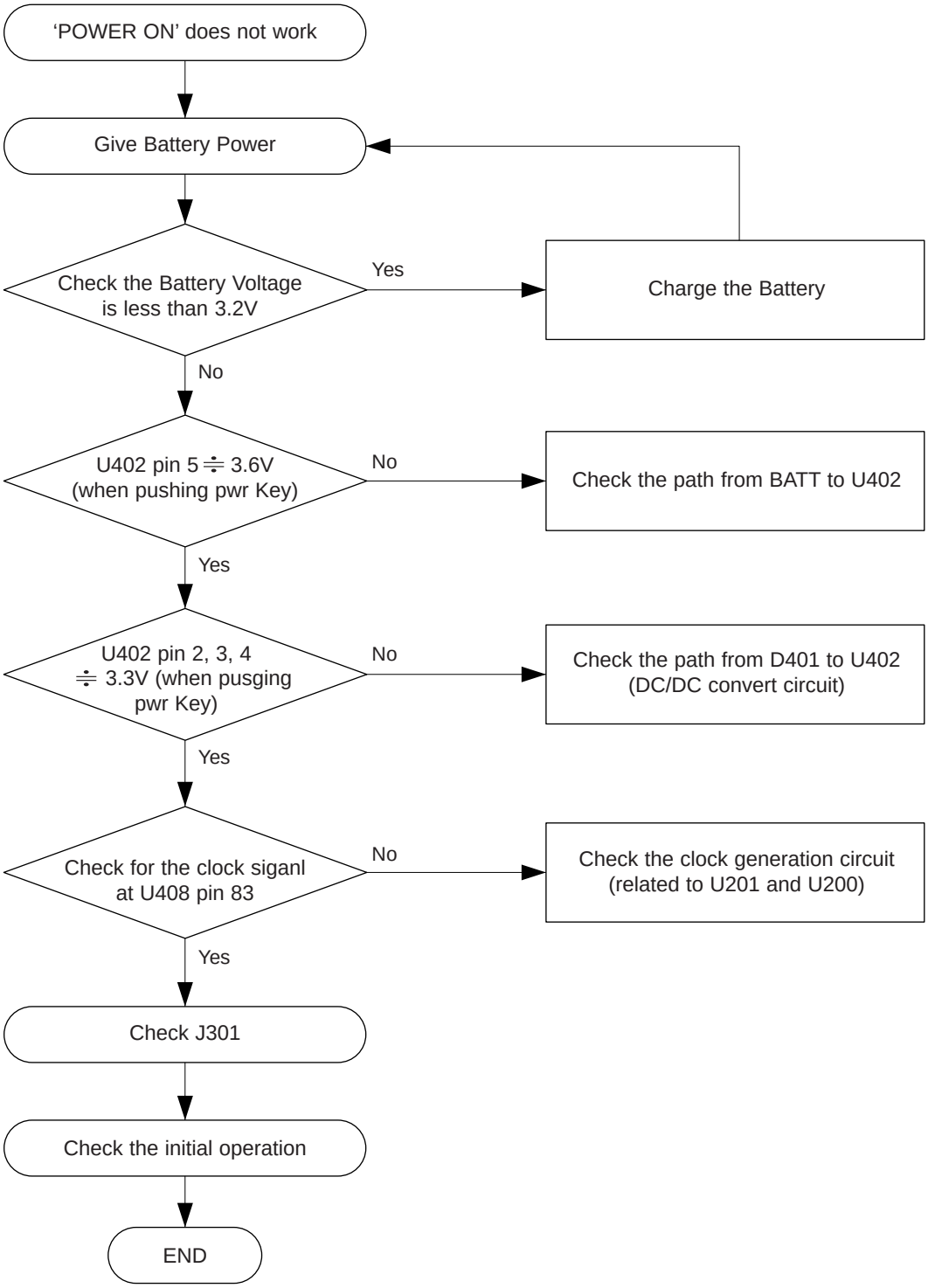


## 5-1-2 TX Power Problem

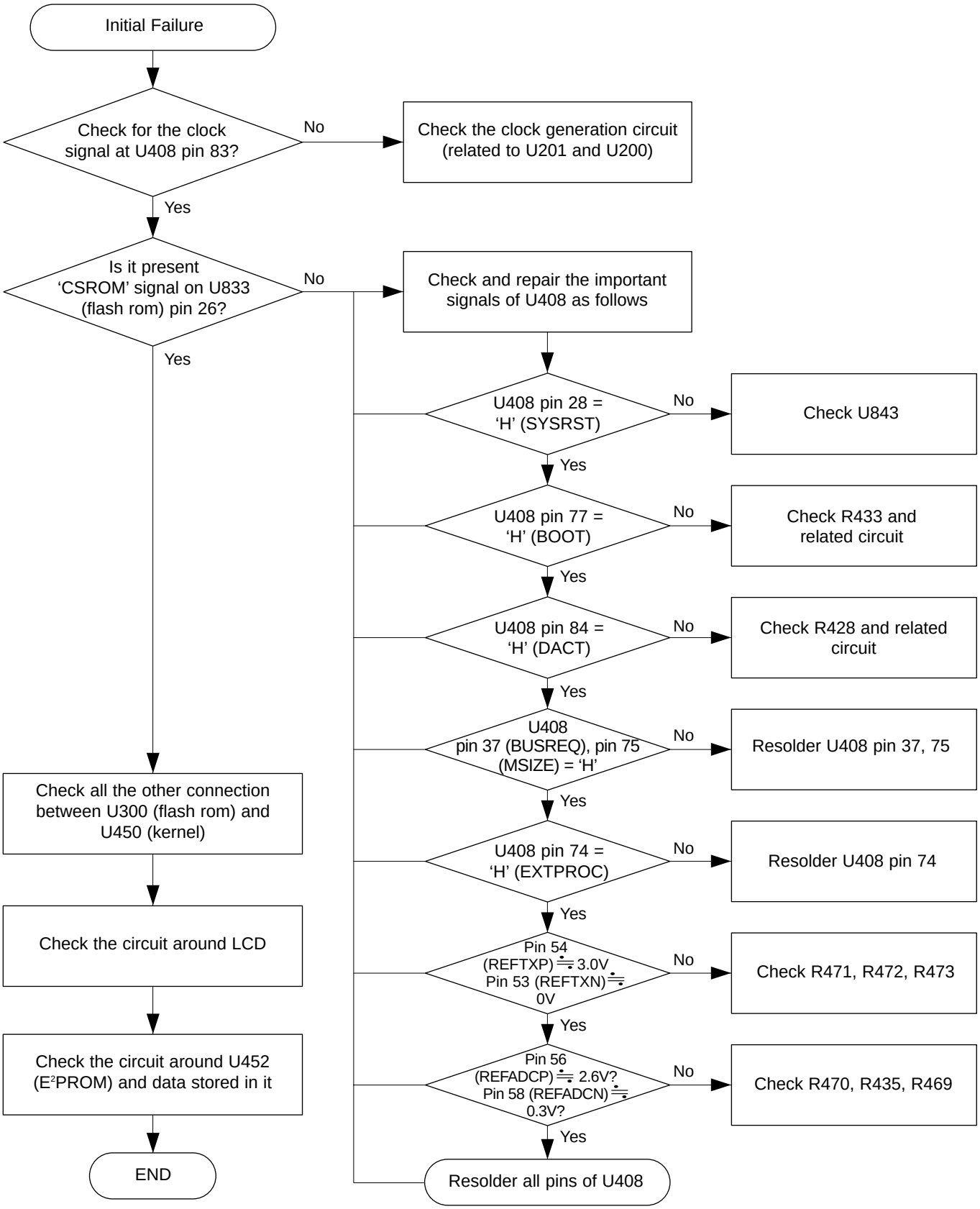


## 5-1-3 Base Band

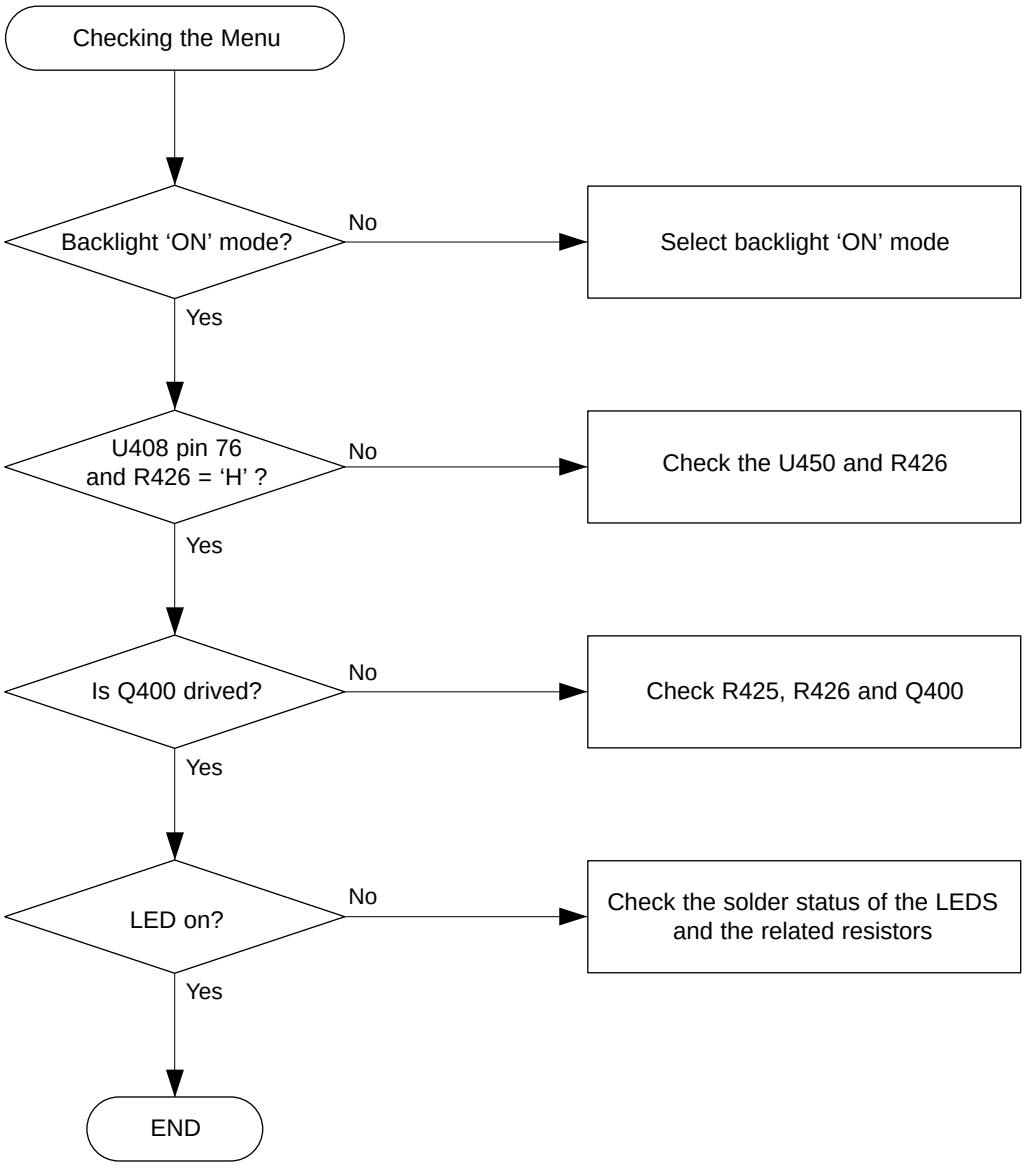
POWER ON


'POWER ON' does not work
Give Battery Power
Check the Battery Voltage is less than 3.2V
Yes
Charge the Battery
No
U402 pin 5 ≒ 3.6V (when pushing pwr Key)
No
Check the path from BATT to U402
Yes
U402 pin 2, 3, 4 ≒ 3.3V (when pusging pwr Key)
No
Check the path from D401 to U402 (DC/DC convert circuit)
Yes
Check for the clock siganl at U408 pin 83
No
Check the clock generation circuit (related to U201 and U200)
Yes
Check J301
Check the initial operation
END

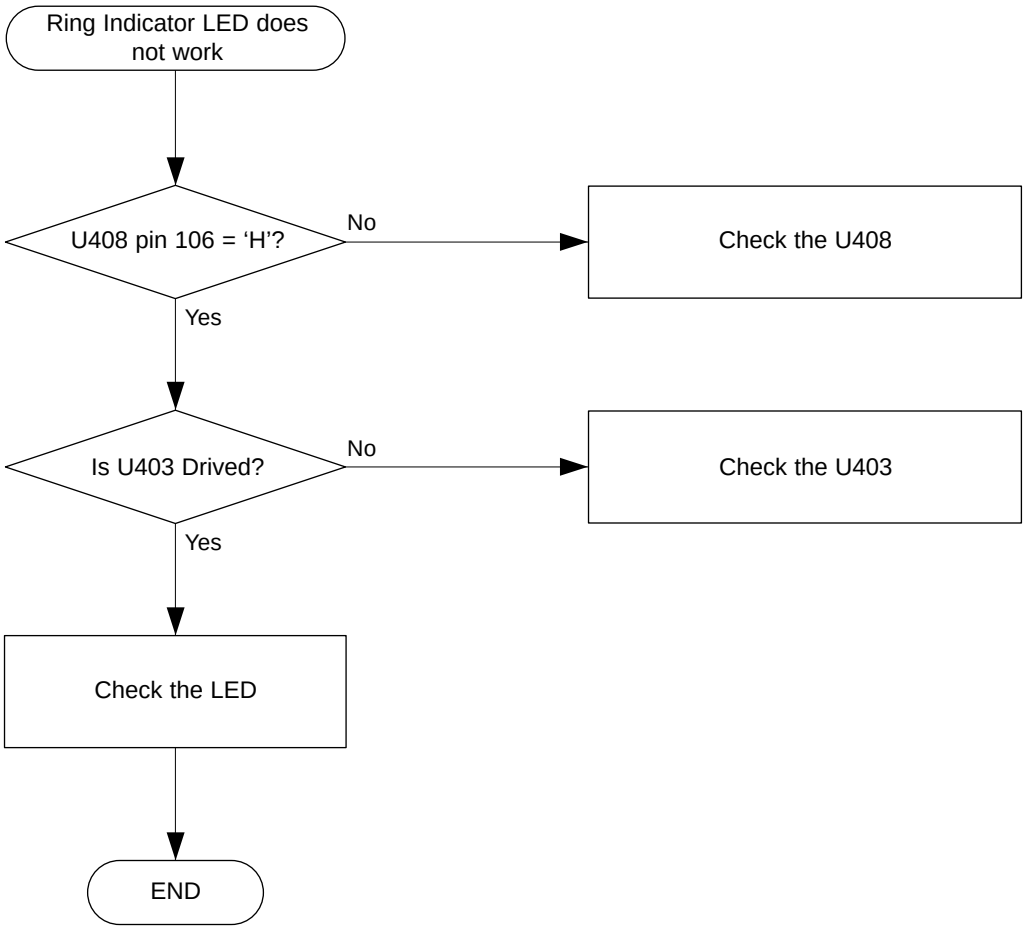
## INITIAL OPERATION


Initial Failure
Check for the clock signal at U408 pin 83?
No
Check the clock generation circuit (related to U201 and U200)
Yes
Is it present 'CSROM' signal on U833 (flash rom) pin 26?
No
Check and repair the important signals of U408 as follows
Yes
U408 pin 28 = 'H' (SYSRST)
No
Check U843
Yes
U408 pin 77 = 'H' (BOOT)
No
Check R433 and related circuit
Yes
U408 pin 84 = 'H' (DACT)
No
Check R428 and related circuit
Yes
U408 pin 37 (BUSREQ), pin 75 (MSIZE) = 'H'
No
Resolder U408 pin 37, 75
Yes
U408 pin 74 = 'H' (EXTPROC)
No
Resolder U408 pin 74
Yes
Pin 54 (REFTXP) 3.0V Pin 53 (REFTXN) 0V
No
Check R471, R472, R473
Yes
Pin 56 (REFADCP) 2.6V? Pin 58 (REFADCN) 0.3V?
No
Check R470, R435, R469
Yes
Resolder all pins of U408
Check all the other connection between U300 (flash rom) and U450 (kernel)
Check the circuit around LCD
Check the circuit around U452 (E²PROM) and data stored in it
END

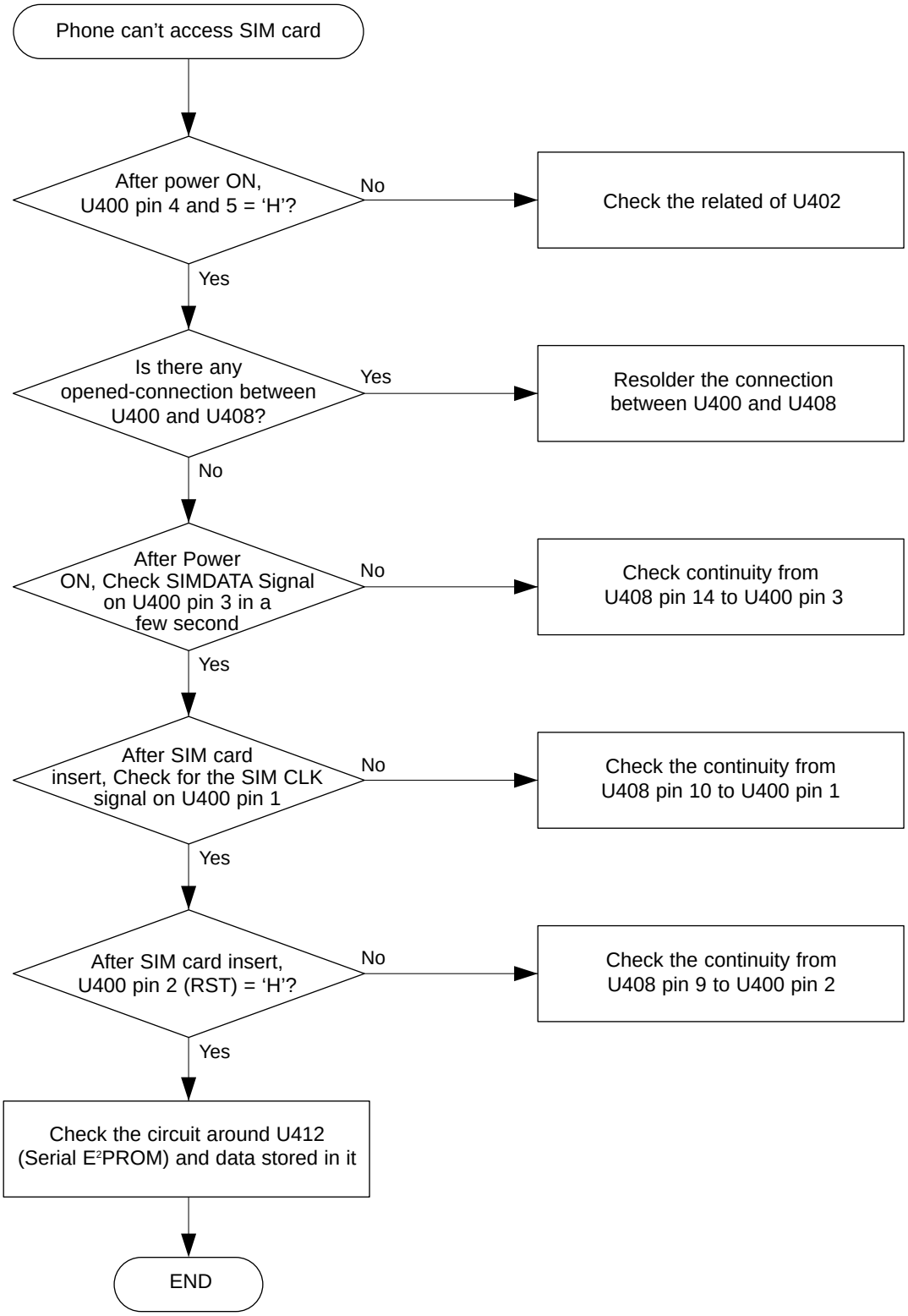
BACKLIGHT


Checking the Menu
Backlight 'ON' mode?
No
Select backlight 'ON' mode
Yes
U408 pin 76
and R426 = 'H' ?
No
Check the U450 and R426
Yes
Is Q400 drived?
No
Check R425, R426 and Q400
Yes
LED on?
No
Check the solder status of the LEDS
and the related resistors
Yes
END

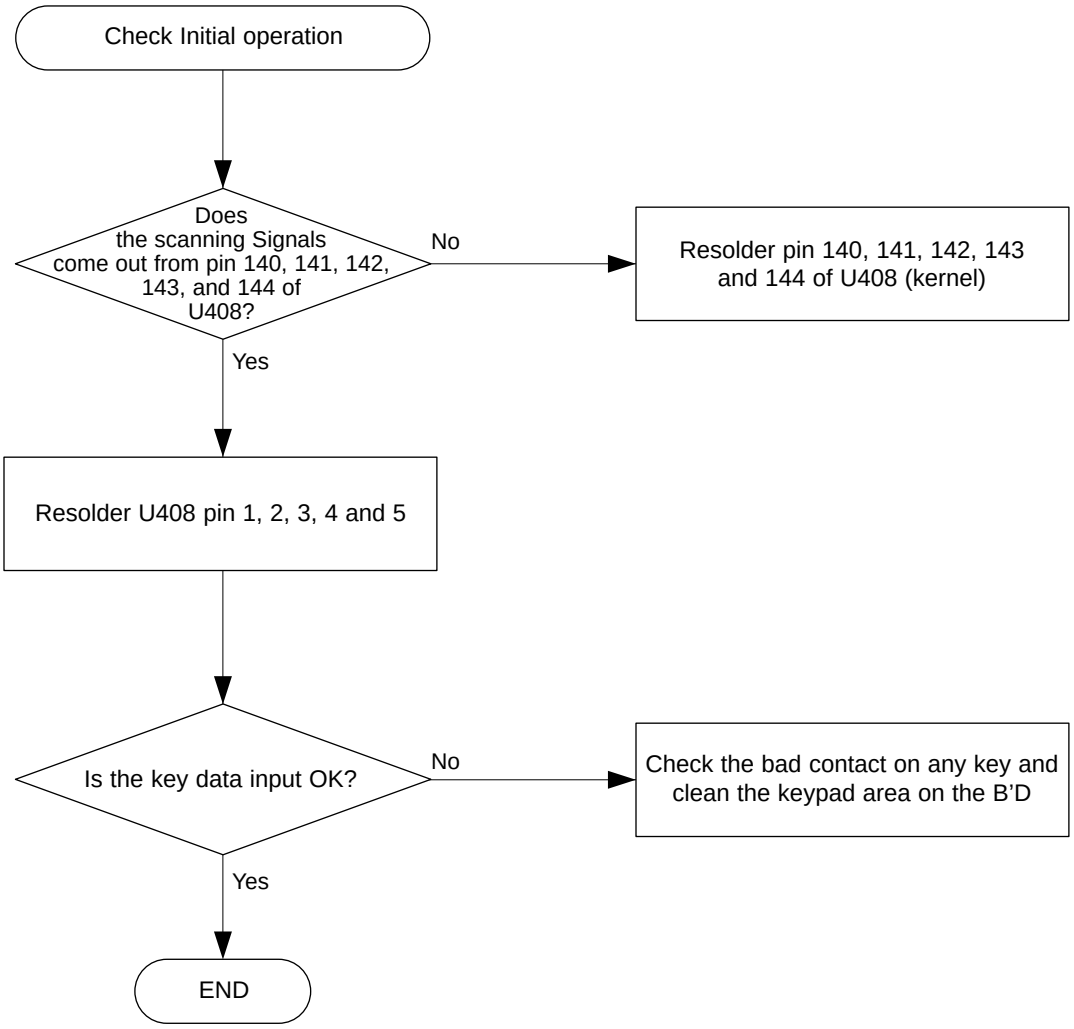
## RING INDICATOR LED



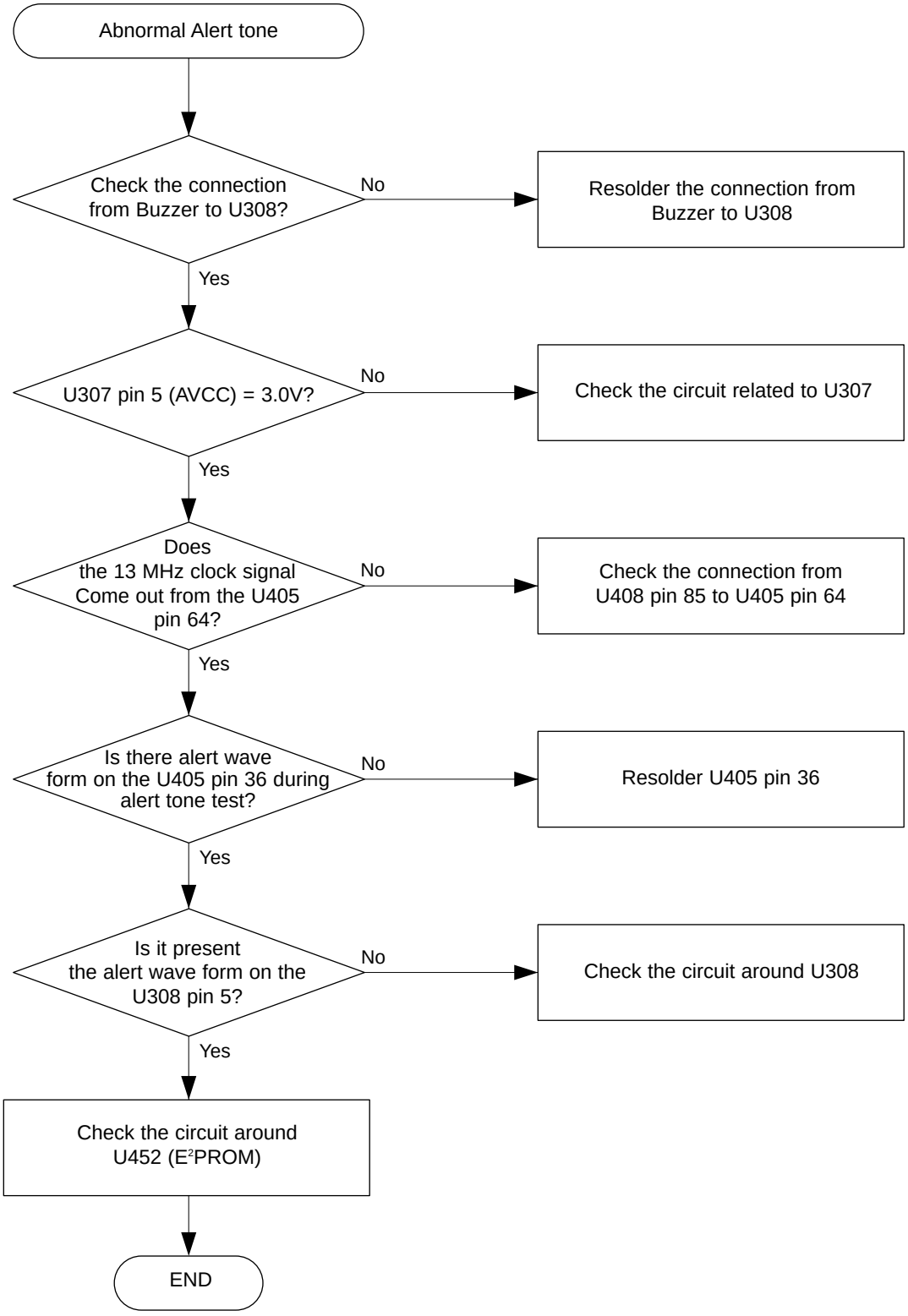
SIM CARD PART


Phone can't access SIM card
After power ON, U400 pin 4 and 5 = 'H'?
No
Check the related of U402
Yes
Is there any opened-connection between U400 and U408?
Yes
Resolder the connection between U400 and U408
No
After Power ON, Check SIMDATA Signal on U400 pin 3 in a few second
No
Check continuity from U408 pin 14 to U400 pin 3
Yes
After SIM card insert, Check for the SIM CLK signal on U400 pin 1
No
Check the continuity from U408 pin 10 to U400 pin 1
Yes
After SIM card insert, U400 pin 2 (RST) = 'H'?
No
Check the continuity from U408 pin 9 to U400 pin 2
Yes
Check the circuit around U412 (Serial E²PROM) and data stored in it
END

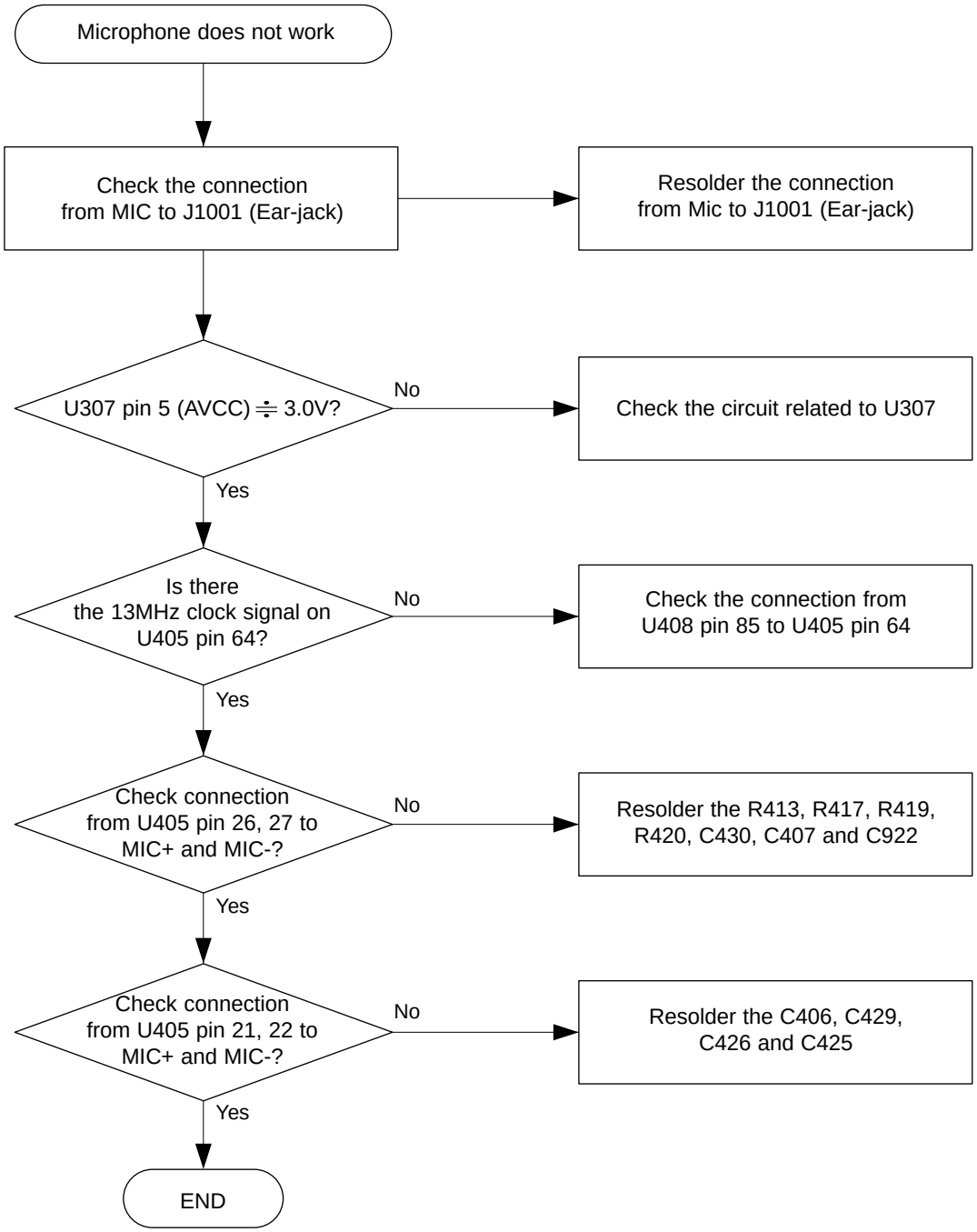
## KEY DATA INPUT


Check Initial operation
Does the scanning Signals come out from pin 140, 141, 142, 143, and 144 of U408?
No
Resolder pin 140, 141, 142, 143 and 144 of U408 (kernel)
Yes
Resolder U408 pin 1, 2, 3, 4 and 5
Is the key data input OK?
No
Check the bad contact on any key and clean the keypad area on the B'D
Yes
END

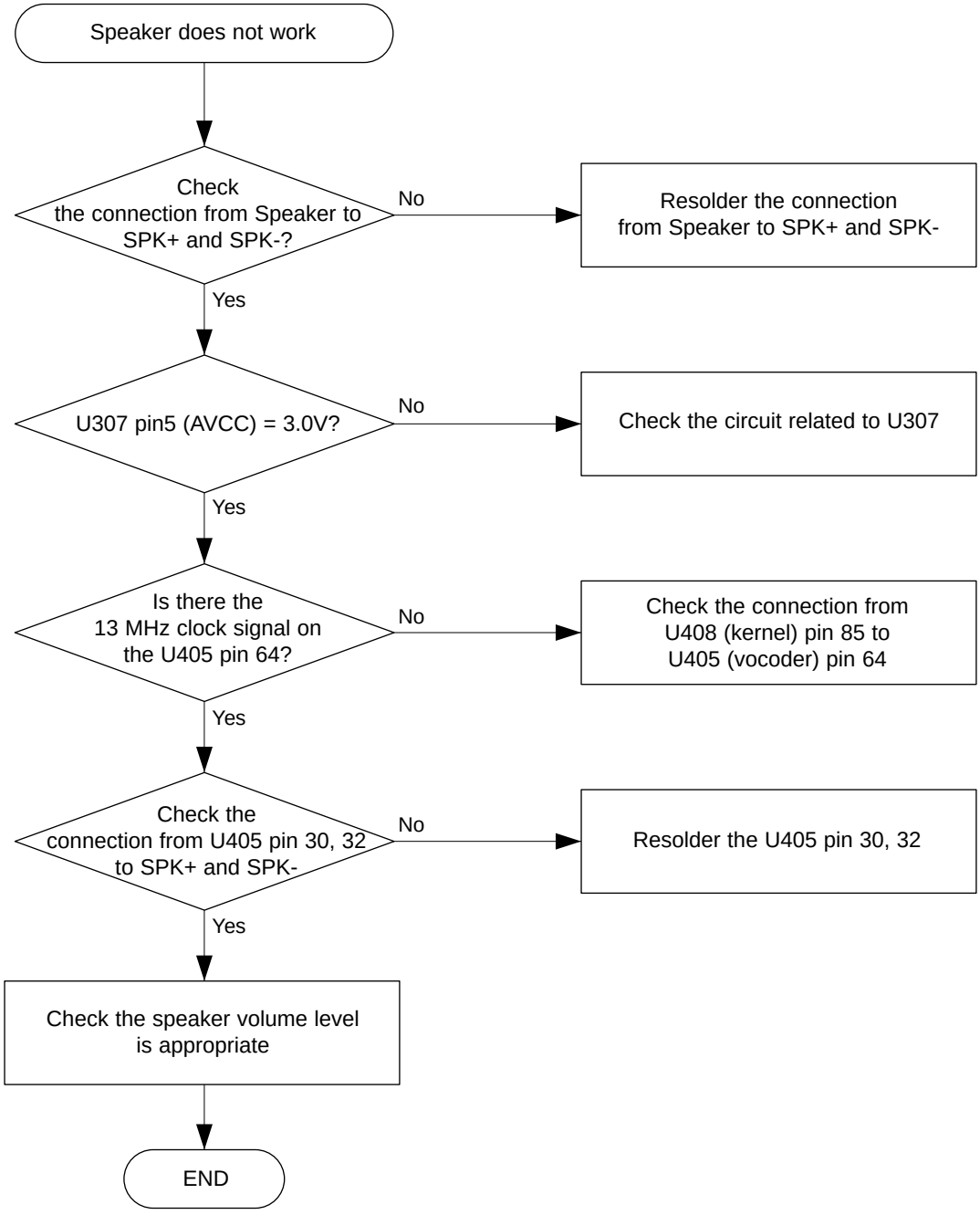
## ALERT TONE


Abnormal Alert tone
Check the connection from Buzzer to U308?
No
Resolder the connection from Buzzer to U308
Yes
U307 pin 5 (AVCC) = 3.0V?
No
Check the circuit related to U307
Yes
Does the 13 MHz clock signal Come out from the U405 pin 64?
No
Check the connection from U408 pin 85 to U405 pin 64
Yes
Is there alert wave form on the U405 pin 36 during alert tone test?
No
Resolder U405 pin 36
Yes
Is it present the alert wave form on the U308 pin 5?
No
Check the circuit around U308
Yes
Check the circuit around U452 (E²PROM)
END

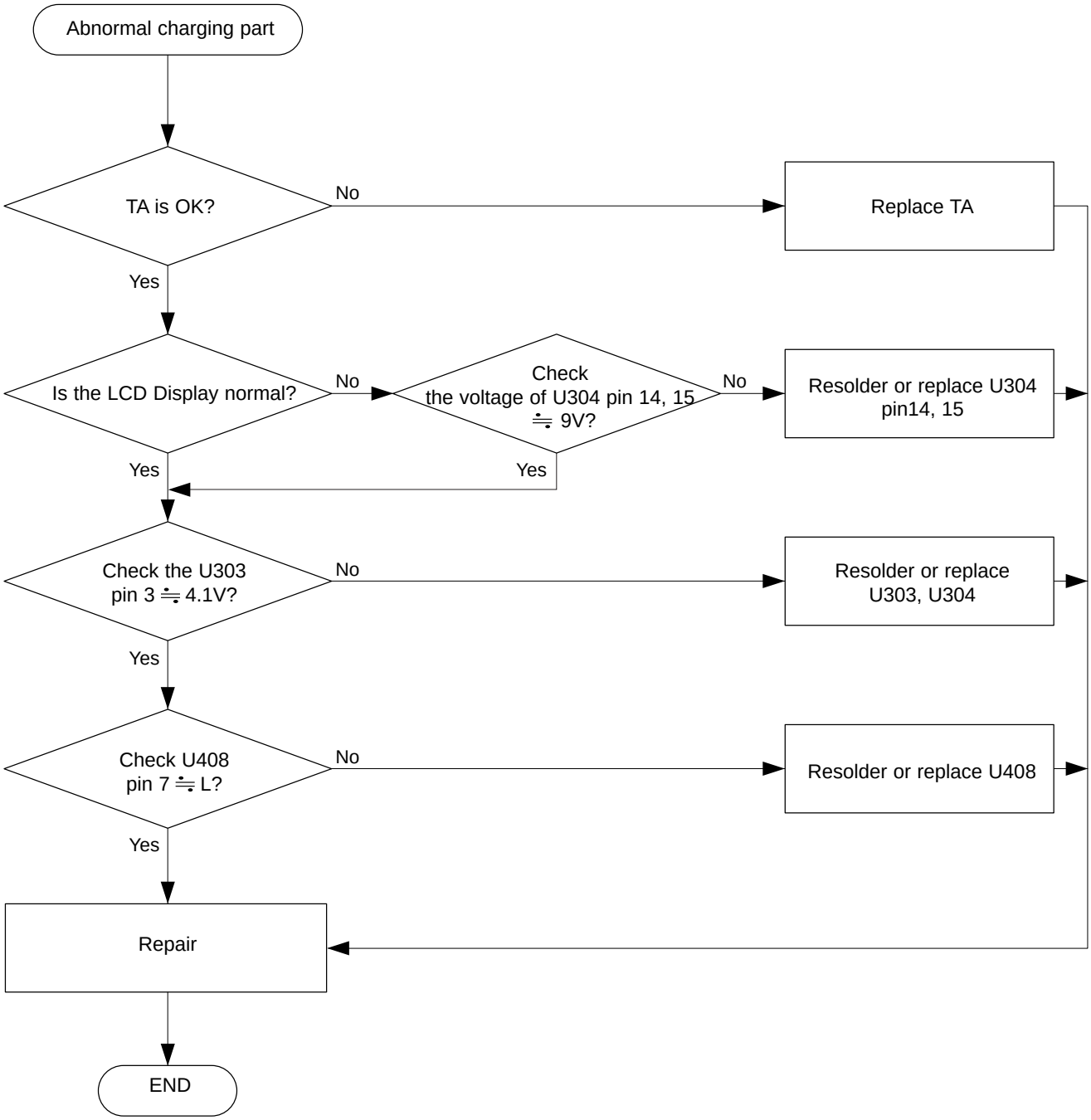
## MICROPHONE PART


Microphone does not work
Check the connection from MIC to J1001 (Ear-jack)
Resolder the connection from Mic to J1001 (Ear-jack)
U307 pin 5 (AVCC) ≒ 3.0V?
No
Check the circuit related to U307
Yes
Is there the 13MHz clock signal on U405 pin 64?
No
Check the connection from U408 pin 85 to U405 pin 64
Yes
Check connection from U405 pin 26, 27 to MIC+ and MIC-?
No
Resolder the R413, R417, R419, R420, C430, C407 and C922
Yes
Check connection from U405 pin 21, 22 to MIC+ and MIC-?
No
Resolder the C406, C429, C426 and C425
Yes
END

SPEAKER PART


Speaker does not work
Check the connection from Speaker to SPK+ and SPK-?
No
Resolder the connection from Speaker to SPK+ and SPK-
Yes
U307 pin5 (AVCC) = 3.0V?
No
Check the circuit related to U307
Yes
Is there the 13 MHz clock signal on the U405 pin 64?
No
Check the connection from U408 (kernel) pin 85 to U405 (vocoder) pin 64
Yes
Check the connection from U405 pin 30, 32 to SPK+ and SPK-
No
Resolder the U405 pin 30, 32
Yes
Check the speaker volume level is appropriate
END

## CHARGING PART



# 8. Exploded View and its Parts List


**8-1 Main Exploded View**

**8-2 Main Parts List**

**8-3 Charger Exploded View**

**8-4 Charger Parts List**

**8-5 Travel Adaptor**

**8-6 Travel Adaptor Parts List**

**8-7 Ciger Light Adaptor**

**8-8 Ciger Light Adaptor Part List**

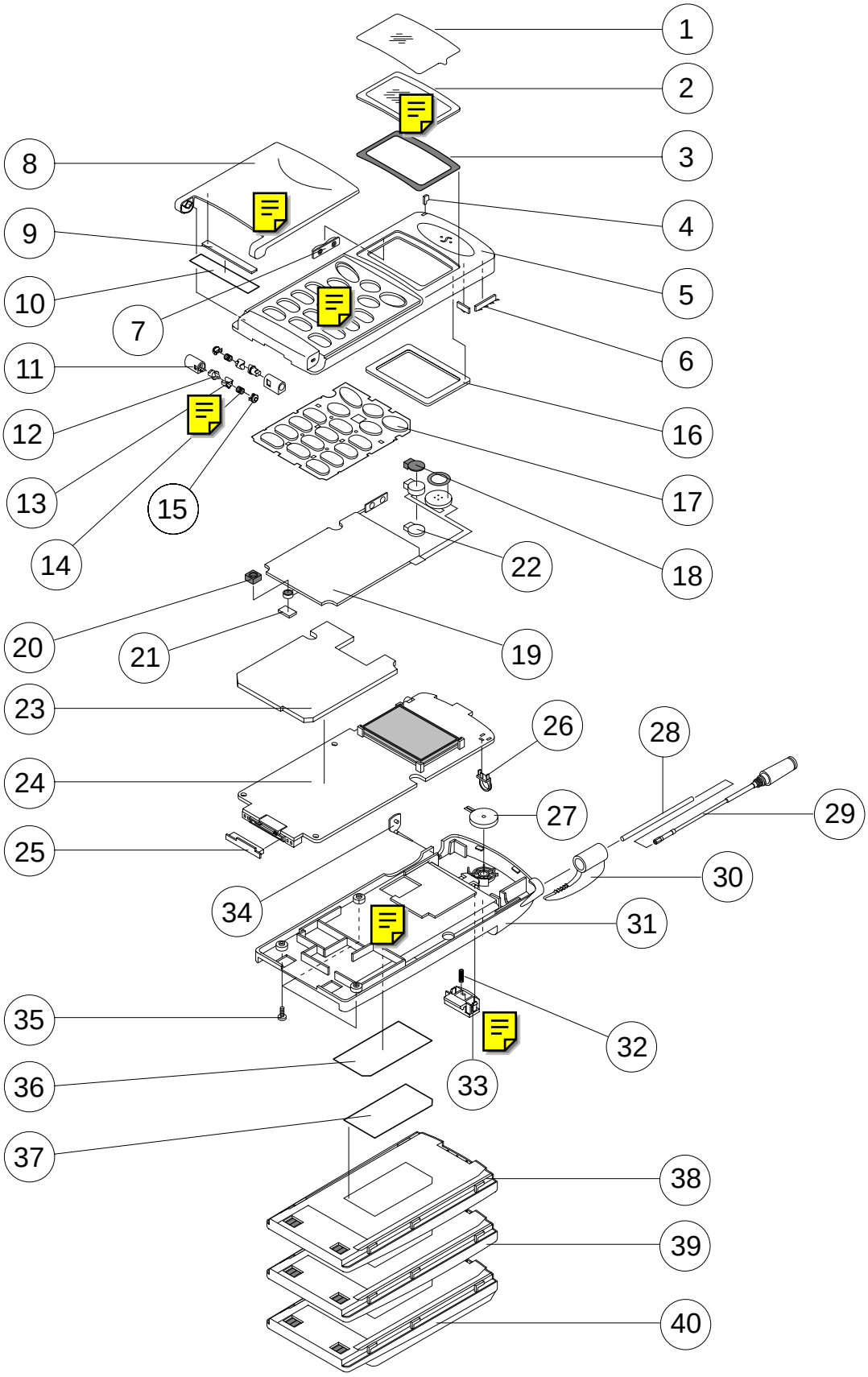
**8-9 Hands Free Kit Diagram**

**8-10 Boost Kit**

**8-11 Hands Free Car Kit Option**

- **8-11-1 Hands Free Car Kit Ass'y**
- **8-11-2 Hands Free Cradle Exploded View**
- **8-11-3 Cradle Mechanism Part List**

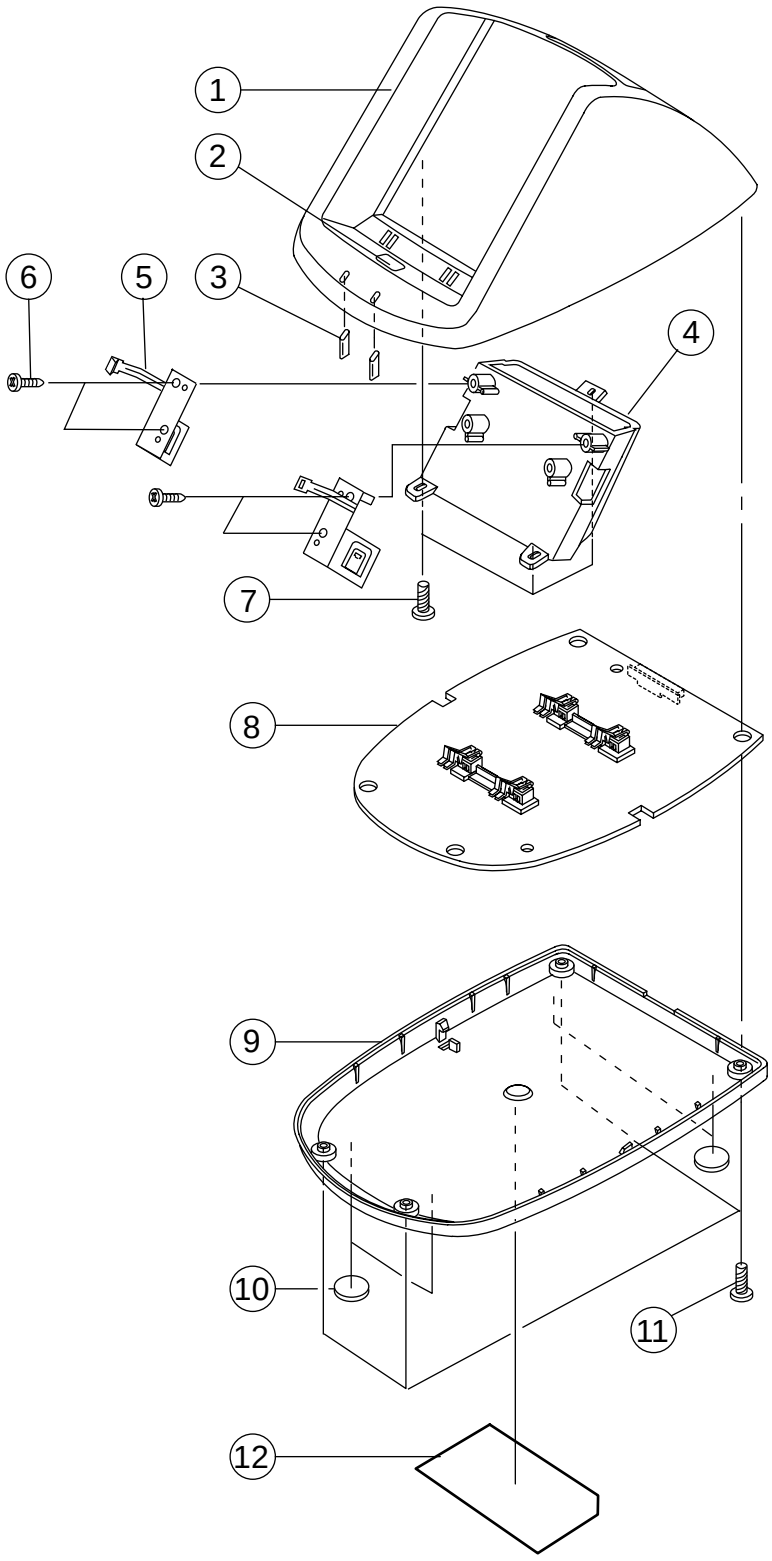
# 8-1 Main Exploded View



## 8-2 Main Parts List

| NO | DESCRIPTION | SEC. CODE | Q'TY | REMARK |
|---|---|---|---|---|
| 1 | TAPE WINDOW BOHO | GH72-10517A | 1 | |
| 2 | LCD WINDOW | GH72-41533A | 1 | |
| 3 | WINDOW TAPE | GH74-40515A | 1 | |
| 4 | LED LENS | GH72-41532A | 1 | |
| 5 | FRONT COVER | GH72-41507A | 1 | |
| 6 | STRIP FINGER A | GH71-10623A | 1 | |
| | STRIP FINGER C | GH71-10641A | 1 | |
| 7 | KEY VOLUME | GH73-30005A | 1 | |
| 8 | FLIP COVER | GH72-41509A | 1 | |
| 9 | MAGENETIC | 3302-001110 | 1 | |
| 10 | MAGENETIC COVER | GH68-31000A | 1 | |
| 11 | HINGE HOUSING | GH72-41543A | 2 | |
| 12 | SHAFT HINGE | GH72-41544A | 2 | |
| 13 | CAM HINGE | GH72-41545A | 2 | |
| 14 | HINGE SPRING | GH61-70018A | 2 | |
| 15 | HOUSING CAP | GH72-41546A | 2 | |
| 16 | SPONGE LCD | GH73-30007A | 1 | |
| 17 | 3 x 4 KEY | GH73-30004A | 1 | |
| 18 | RUBBER BUZZER | GH73-30006A | 1 | |
| 19 | KEY PBA | GH96-01126A | 1 | |
| 20 | RUBBER MIC | GH73-40684A | 1 | |
| 21 | MIC COVER | GH74-10745A | 1 | |
| 22 | ISO-TAPE | GH74-40516A | 1 | |
| 23 | SHIELD CAN | GH72-41531A | 1 | |
| 24 | MAIN PBA | GH96-01095A | 1 | |
| 25 | RUBBER CONNECTOR | GH73-40639A | 1 | |
| 26 | ANTT BRACKET | GH71-10703A | 1 | |
| 27 | MOTOR | GH31-10004A | 1 | |
| 28 | ANTENA TUBE | | 1 | |
| 29 | ANTENA | GH42-10523A | 1 | |
| 30 | CLIP | GH72-41687A | 1 | |
| 31 | REAR COVER | GH72-41508A | 1 | |
| 32 | LOCKER SPRING | GH70-10516A | 1 | |
| 33 | LOCKER MAIN | GH72-41510A | 1 | |
| 34 | EARPHONE COVER | GH73-40683A | 1 | |
| 35 | SCREW M2 x 5 | 6001-001148 | 4 | |
| 36 | BASE LABEL | GH68-31153A | 1 | |
| 37 | BATT LABEL | GH68-31154A | 1 | |
| 38 | STD BATTERY | GH43-10314A | 1 | |
| 39 | LONG BATTERY | GH43-10333A | 1 | |
| 40 | SLIM BATTERY | GH43-10315A | 1 | |

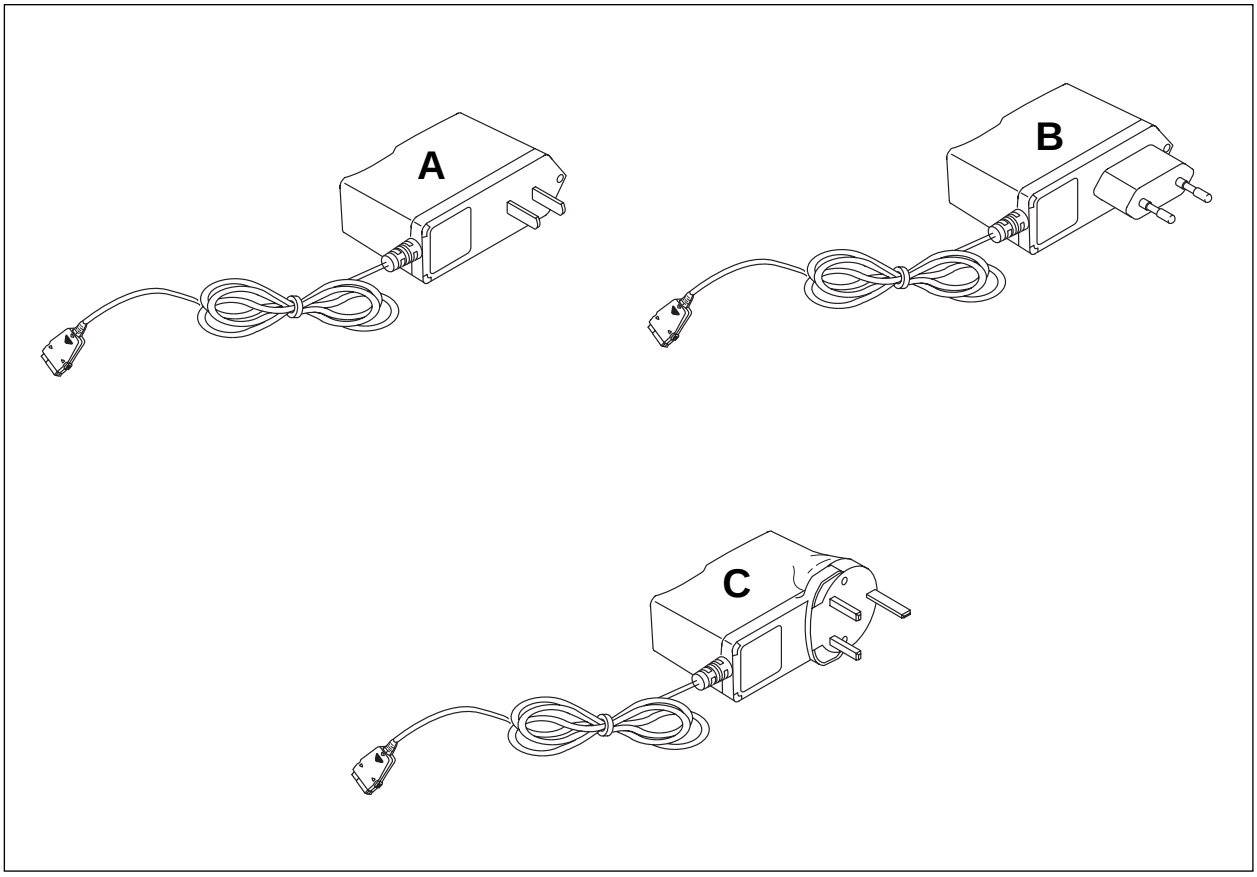
## 8-3 Charger Exploded View



## 8-4 Charger Parts List

| NO | DESCRIPTION | CODE | Q'TY | REMARK |
|---|---|---|---|---|
| 1 | CHARGER UPPER | DMM000043 | 1 | |
| 2 | GATE LABEL | DMM500024 | 1 | |
| 3 | LED CAP | DMM000053 | 2 | |
| 4 | BATTERY HOUSIN | DMM000044 | 1 | |
| 5 | HANDY LOCKER | DMM000046 | 2 | |
| 6 | SCREW M2.6 x 6 | 6003-000107 | 4 EA | |
| 7 | SCREW M3 x 6 | 6003-000115 | 3 EA | |
| 8 | PBA | | 1 | |
| 9 | DTC LOWER | DMM000049 | 1 | |
| 10 | BUMPON | DMM300004 | 4 | |
| 11 | SCREW M3 x 12 | 6003-000161 | 4 | |
| 12 | LABEL | DMM500026 | 1 | |

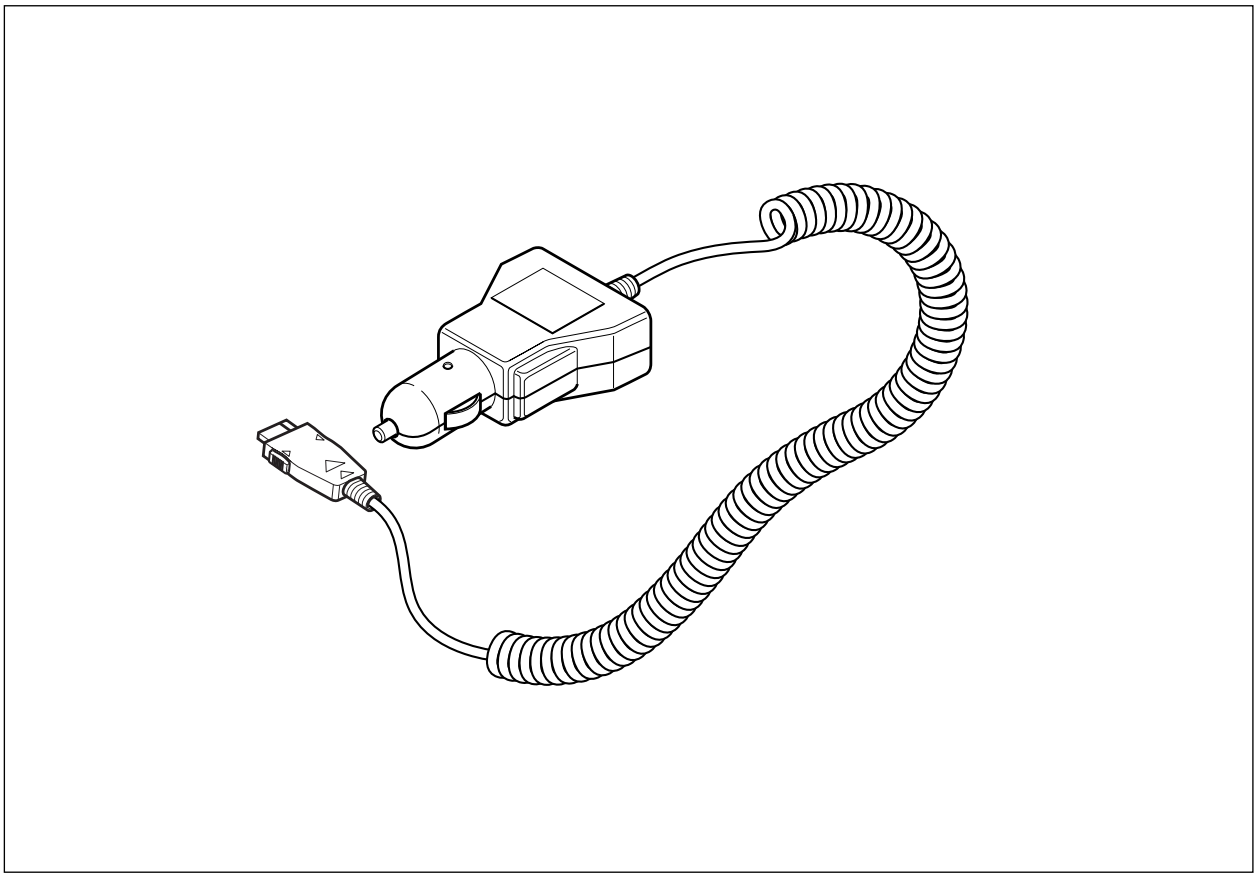
## 8-5 Travel Adaptor




## 8-6 Travel Adaptor Parts List

| Type | SEC Code | Remark |
|---|---|---|
| A | GH44-30548A | CHINA |
| B | GH44-30549A | EUROPE |
| C | GH44-30547A | UNITED KINGDOM |

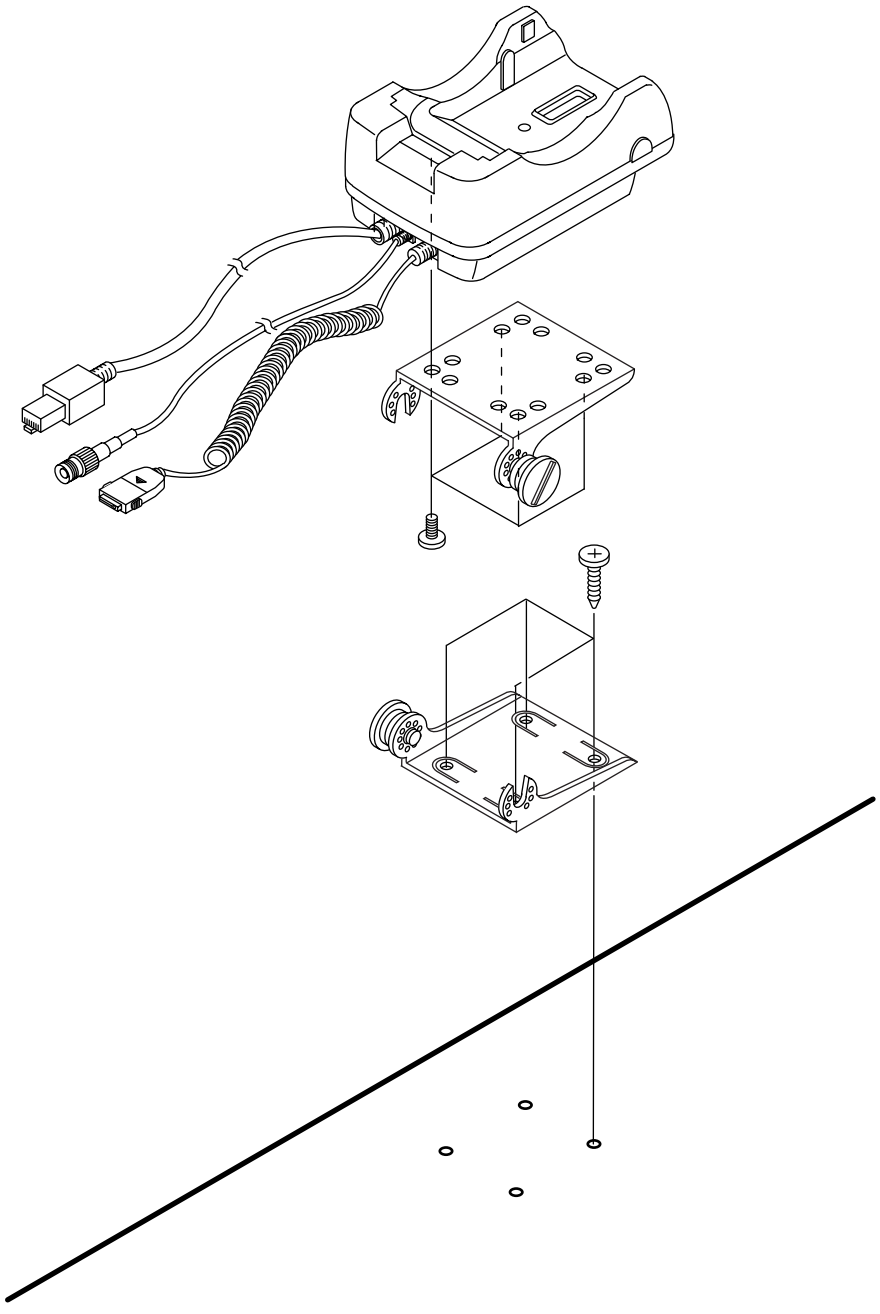
## 8-7 Ciger Light Adaptor



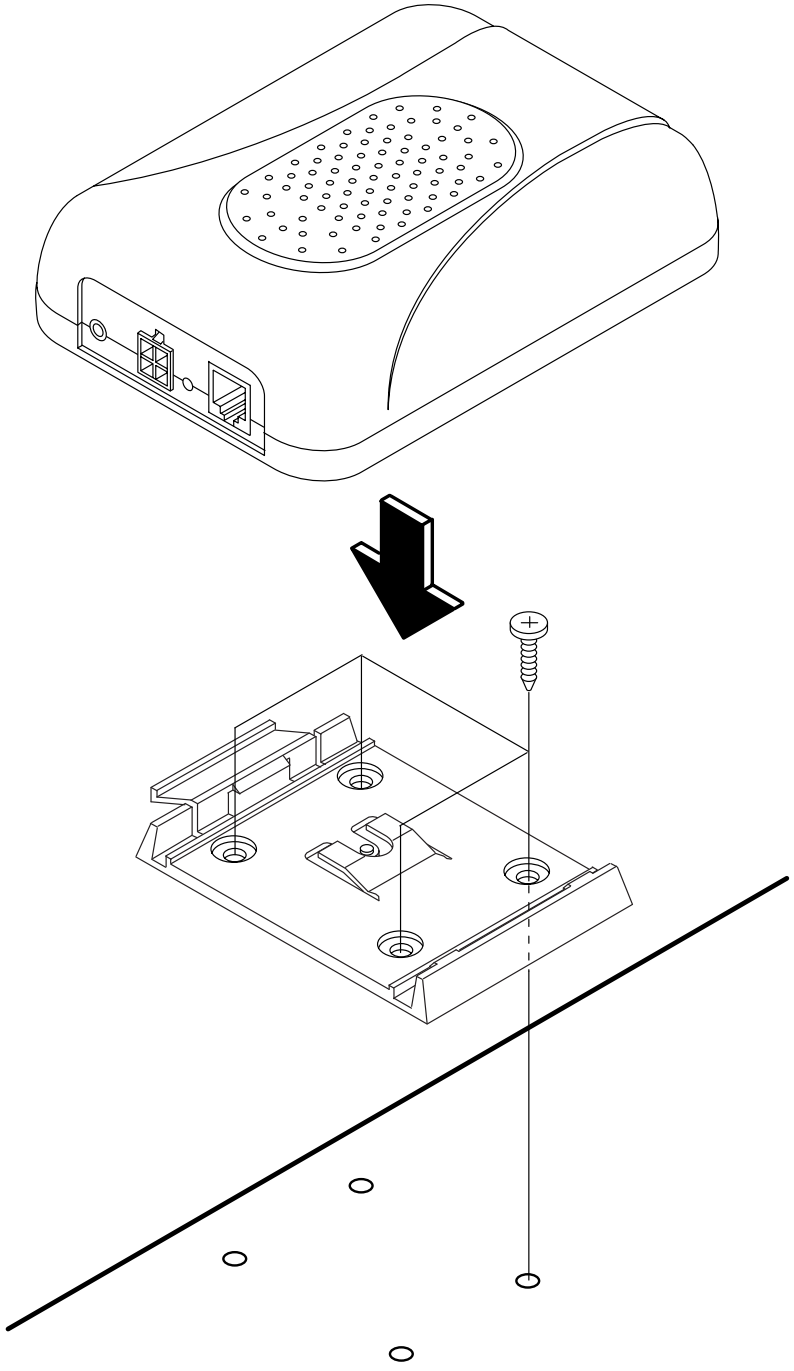
## 8-8 Ciger Light Adaptor Part List

| Description | SEC Code | Remark |
|---|---|---|
| Ciger Light Adaptor Code | GH44-30546A | BLACK |

## 8-9 Hands Free Kit Diagram

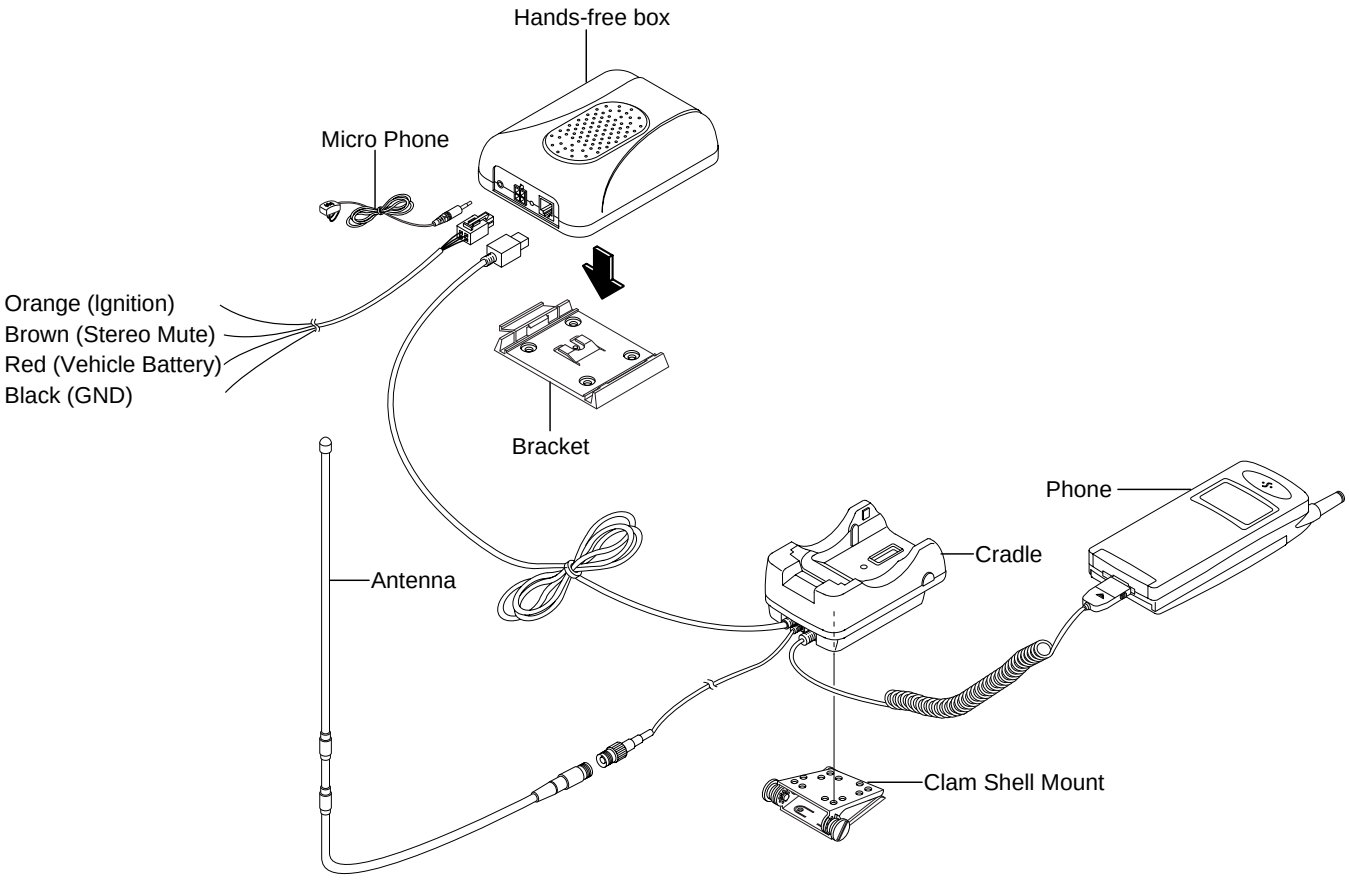


## 8-10 Boost Kit



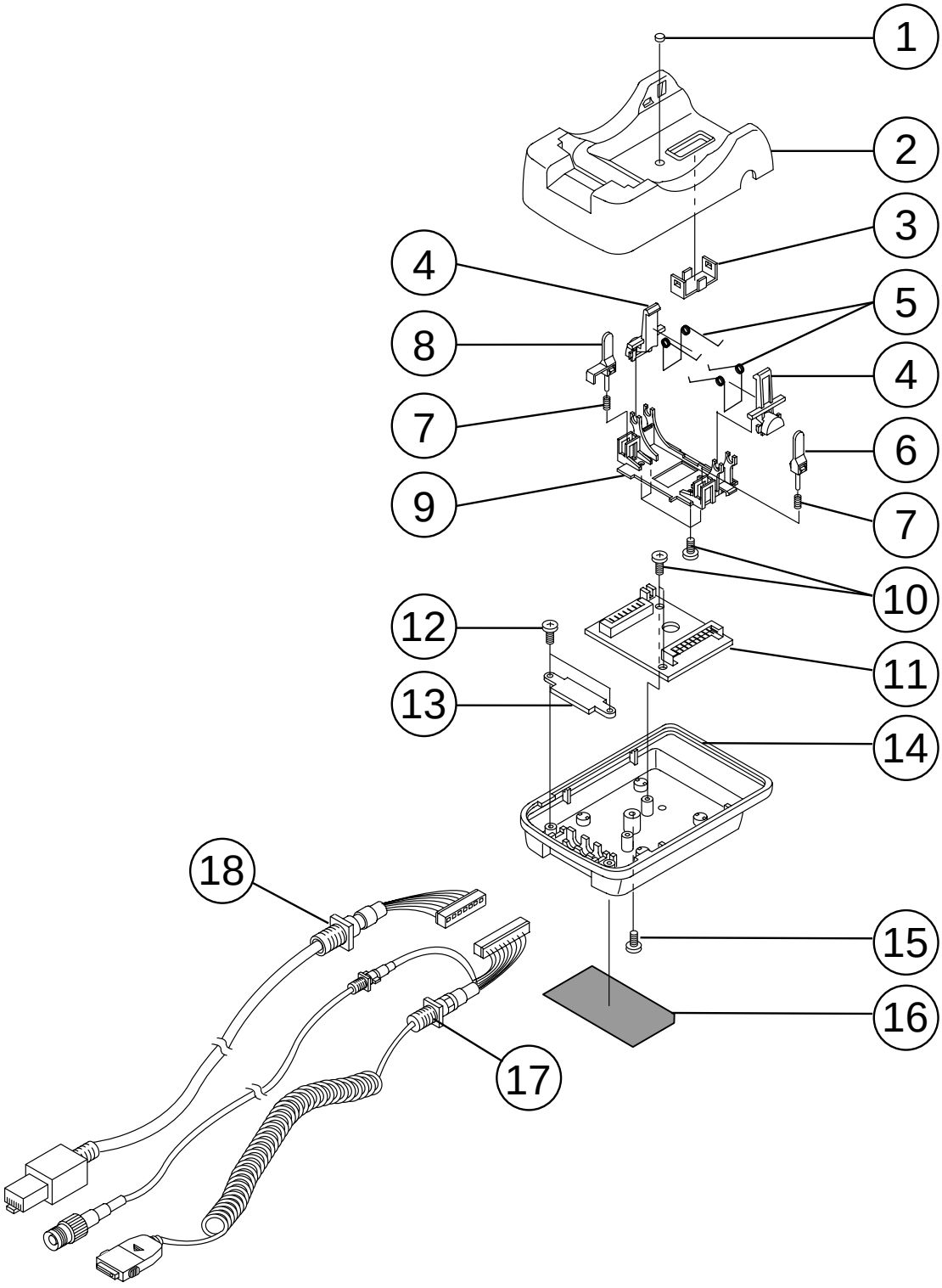
# 8-11 Hands Free Car Kit Option

## 8-11-1 Hands Free Car Kit Ass'y




Option Code: GH96-01150A

## 8-11-2 Hands Free Cradle Exploded View



## 8-11-3 Cradle Mechanism Part List

| NO | DESCRIPTION | SEC. CODE | Q'TY | REMARK |
|---|---|---|---|---|
| 1 | GATE LABEL | GH68-11107A | 1 | |
| 2 | CRADLE UPPER | GH72-41519A | 1 | |
| 3 | SOCKET PLATE | GH70-10526A | 1 | |
| 4 | LOCKER | GH72-41521A | 2 | |
| 5 | TORSION SPRING | GH61-70012A | 2 | |
| 6 | EJECTOR PIN(R) | GH72-41524A | 1 | |
| 7 | EJECTOR SPRING | GH70-10520A | 2 | |
| 8 | EJECTOR PIN(L) | GH72-41523A | 1 | |
| 9 | CLAMP | GH72-41522A | 1 | |
| 10 | SCREW M2.6 x 6, +, BH | 6003-000107 | 6 | |
| 11 | PCB | GH41-10639A | 1 | |
| 12 | SCREW M2 x 6, +, BH | 6003-000158 | 2 | |
| 13 | CABLE CAP | GH72-41252A | 1 | |
| 14 | CRADLE LOWER | GH72-41520A | 1 | |
| 15 | SCREW M3 x 8, +, BH | 6001-000158 | 1 | |
| 16 | CRADLE LABEL | GH68-31163A | 1 | |
| 17 | EJECTOR | GH72-41523A | | |
| 18 | CRADLE DATA CABLE | | | |

# 7. Electrical Parts List

## 7-1 Main Top

| LOCATION NO. | DESCRIPTION | SEC CODE | REMARK |
|---|---|---|---|
| D302, D303, D304 | DIODE-SCHOTTY, UPS5817 | 0404-001044 | |
| D301 | DIODE-ARRAY, DAN222 | 0407-001002 | |
| D305, D306 | DIODE-ARRAY, SMS05-4 | 0407-001030 | |
| Q300 | TR-SMALL SIGNAL, 2SC4081 | 0501-000218 | |
| U106, U847 | TR-DIGITAL, DTC114EEA | 0504-000167 | |
| U303, U851, U853, U860 | TR-DIGITAL, DTC144EEA | 0504-000168 | |
| U403 | TR-DIGITAL, DTC114YETL | 0504-001012 | |
| U105, U848 | TR-DIGITAL, DTB113ZK | 0504-001021 | |
| U109, U309, U310 | TR-ARRAY, UMC5N | 0506-001004 | |
| D300 | LED, CHIP, CL-150YG-CD-T | 0601-000276 | |
| U842 | IC-CMOS LOGIC, TC7S32FU | 0801-000796 | |
| U852 | IC-CMOS LOGIC, TC7S04FU | 0801-002345 | |
| U833 | IC-FLASH MEMORY, MBM29LV800T-10PN | 1107-001062 | |
| U834 | IC-ETC. MEMORY, LRS1306 | 1109-001081 | |
| U839 | IC-BUFFER AMP, UPC2746TB | 1201-001326 | |
| U850 | IC-OP AMP, MC34119DTB | 1201-001341 | |
| U841 | IC-VOLFAGECOMP, TC75W56FU | 1202-001022 | |
| U103, U108 | IC-SWITCH VOL. REG. MIC5205-3.0BM | 1203-001285 | |
| U110, U406 | IC-VOLTAGE REGULATOR, LP2981AIM5-3.0 | 1203-001454 | |
| U304 | IC-CHARGE, LT1510-5CGN | 1203-001515 | |
| U311 | IC-VOLTAGE REGULATOR, TC1015-33VCT | 1203-001592 | |
| U102 | IC-BRIGHT, HD155101BF | 1204-001405 | |
| U312 | IC-RTC, RS5C372A | 1206-001009 | |
| U101 | IC-Synthesizer, LMX2336LTMX | 1209-001161 | |
| R134, R135, R301 | R-CHIP, 100ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000138 | |
| R404 | R-CHIP, 220ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000139 | |
| R112, R305, R520, R522 | R-CHIP, 1Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000140 | |
| R137 | R-CHIP, 2.2Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000141 | |
| R102 | R-CHIP, 2.7Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000142 | |
| R139 | R-CHIP, 4.7Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000143 | |
| R128 | R-CHIP, 8.2Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000147 | |
| R101, R315, R525, R970 | R-CHIP, 10Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000148 | |
| R113 | R-CHIP, 12Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000149 | |
| R115 | R-CHIP, 47Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000157 | |

| LOCATION NO. | DESCRIPTION | SEC CODE | REMARK |
|---|---|---|---|
| R524 | R-CHIP, 68Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000160 | |
| R123, R126 | R-CHIP, 82Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000161 | |
| R300, R960, R961, R965, R966 | R-CHIP, 100Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000162 | |
| R136 | R-CHIP, 0ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000171 | |
| R100, R103, R105, R116, R129, R138, R503 | R-CHIP, 10ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000172 | |
| R107, R108, R109, R117, R120, R121 | R-CHIP, 18ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001288 | |
| R309 | R-CHIP, 39ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001295 | |
| R504 | R-CHIP, 51ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001298 | |
| R131, R132, R133 | R-CHIP, 68ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001301 | |
| R114 | R-CHIP, 18Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-001333 | |
| R306 | R-CHIP, 300ohm, 5%, 1/16W, DA, TP, 1005 | 2007-007008 | |
| R311 | R-CHIP, 100Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007107 | |
| R302 | R-CHIP, 18Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007135 | |
| R507 | R-CHIP, 10Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007142 | |
| R304 | R-CHIP, 12Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007309 | |
| R307 | R-CHIP, 7.5Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007470 | |
| R310 | R-CHIP, 82Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007590 | |
| R303 | R-CHIP, 270kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007592 | |
| R506, R510 | R-CHIP, 16Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007627 | |
| R505 | R-CHIP, 14Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007630 | |
| C103, C105, C110, C112, C113, C116, C130, C139, C927 | C-CHIP, 100pF, 5%, 50V, TP, 1005 | 2203-000234 | |
| C125, C143, C144, C148, C149, C153, C155, C175, C176, C317, C931, C973, C974 | C-CHIP, 10nF, 10%, 16V, TP, 1005 | 2203-000254 | |
| C104 | C-CHIP, 120pF, 5%, 50V, TP, 1005 | 2203-000311 | |
| C124 | C-CHIP, 150pF, 5%, 50V, TP, 1005 | 2203-000359 | |
| C119, C122, C135, C152, C163, C169, C924 | C-CHIP, 1nF, 10%, 50V, TP, 1005 | 2203-000438 | |
| C146 | C-CHIP, 1pF, 0.25pF, 50V, TP, 1005 | 2203-000466 | |
| C109 | C-CHIP, 2.2nF, 10%, 50V, TP, 1005 | 2203-000489 | |
| C114, C118, C159, C161, C165, C925, C926, C957 | C-CHIP, 22pF, 5%, 50V, TP, 1005 | 2203-000628 | |
| C162 | C-CHIP, 2pF, 0.25pF, 50V, TP, 1005 | 2203-000696 | |
| C136, C140, C141, C147, C170 | C-CHIP, 33pF, 5%, 50V, TP, 1005 | 2203-000812 | |
| C101, C171, C920 | C-CHIP, 3pF, 0.25pF, 50V, TP, 1005 | 2203-000870 | |

| LOCATION NO. | DESCRIPTION | SEC CODE | REMARK |
|---|---|---|---|
| C120 | C-CHIP, 4.7nF, 10%, 50V, TP, 1608 | 2203-000888 | |
| C138, C949 | C-CHIP, 470pF, 10%, 50V, TP, 1005 | 2203-000941 | |
| C131, C134 | C-CHIP, 47pF, 5%, 50V, TP, 1005 | 2203-000995 | |
| C172 | C-CHIP, 4pF, 0.25pF, 50V, TP, 1005 | 2203-001017 | |
| C142 | C-CHIP, 6.8nF, 10%%, 50V, TP, 1608 | 2203-001103 | |
| C167, C168, C174 | C-CHIP, 8pF, 0.5pF, 50V, TP, 1005 | 2203-001259 | |
| C160 | C-CHIP, 0.5pF, 0.25pF, 50V, TP, 1005 | 2203-001383 | |
| C108 | C-CHIP, 12nF, 10%, 50V, TP, 1608 | 2203-001389 | |
| C948 | C-CHIP, 47nF, 10%, 16V, TP, 1005 | 2203-001432 | |
| C145, C157, C158, C177, | C-CHIP, 2.2uF, +80-20%, 16V, TP, 2012 | 2203-001598 | |
| C117 | C-CHIP, 330pF, 10%, 50V, TP, 1005 | 2203-002443 | |
| C164 | C-CHIP, 1.8pF, 0.25pF, 50V, TP, 1005 | 2203-005050 | |
| C102, C106, C111, C115, C300, C302, C304, C919 | C-CHIP, 100nF, +80-20%, 16V, TP, 1005 | 2203-005061 | |
| C303, C963, C964, C965, C966, C967, C968, C969, C970 | C-CHIP, 1uF, +80-20%, 10V, TP, 1608 | 2203-005065 | |
| C945, C946, C947 | C-CHIP, 220nF, +80-20%, 16V, TP, 1005 | 2203-005496 | |
| C305 | CAP-TANTAL, 6.8uF, 20%, 16V, 3528 | 2404-000318 | |
| C150 | CAP-TANTAL, 1uF, 20%, 10V, 2012 | 2404-001017 | |
| C151, C154, C173, C316, C961, C962 | CAP-TANTAL, 10uF, 20%, 6.3V, 2012 | 2404-001064 | |
| L104 | Inductor, 10nH, 5%, 1608 | 2703-001040 | |
| L100 | Inductor, 8.2nH, 5%, 1608 | 2703-001167 | |
| L101 | Inductor, 82nH, 5%, 1608 | 2703-001293 | |
| L105 | Inductor, 68nH, 5%, 1608 | 2703-001514 | |
| L106, L108 | Inductor, 47nH, 5%, 1608 | 2703-001545 | |
| L300 | Inductor 10uH, 20%, 6.6x4.45x2.8 | 2703-001740 | |
| X300 | CRYSTAL, MC-206 | 2801-003602 | |
| U104 | VCO, ENFVH182S54 | 2806-001161 | |
| U100 | VCO, ENFVH1B2S44 | 2806-001162 | |
| U849 | IF VCO, VOU0540N30KRA | 2806-001176 | |
| E6 | EMI FILTER, NFM39R12C471T1M | 2901-001116 | |
| F100 | FILTER-SAW, B4822 | 2904-001092 | |
| F101 | FILTER-SAW, FAR-F5CE-947M50-D235-W | 2904-001124 | |
| J301 | B'd Connector, AXN720535P | 3710-000341 | |
| BAT300 | 65uAH, Battery, PAS614L | 4302-001026 | |
| R532, R502, C922, C921, C923, C100, C123, C137, U838 | | N.C POINT | |
| W100 | SEMIRIGID CABLE | GH39-20015A | |

# 7-2 Main Bottom

| LOCATION NO. | DESCRIPTION | SEC CODE | REMARK |
|---|---|---|---|
| D400 | DIODE-SCHOTTY, PRLL5819 | 0404-001005 | |
| U206 | DIODE-SCHOTTY, HSMS2805 | 0404-001054 | |
| D404 | ESD DIODE, SMO5 | 0406-001005 | |
| D402 | ESD DIODE, SM12 | 0406-001012 | |
| D401 | DIODE-ARRAY, UMN1 | 0407-001007 | |
| D403 | DIODE-ARRAY, SMS05-4 | 0407-001030 | |
| Q401 | TR-SMALL SIGNAL, 2SA1576 | 0501-000162 | |
| Q400 | TR-SMALL SIGNAL, 2SD2114KT146 | 0501-002011 | |
| Q200 | TR-SMALL SIGNAL, BFP420 | 0501-002096 | |
| U401, U407 | TR-DIGITAL, DTC144EEA | 0504-000168 | |
| U410 | TR-ARRAY, UMC5N | 0506-001004 | |
| U200 | TR-ARRAY, UMZ2N | 0506-001024 | |
| U861 | IC-CMOS LOGIC, TC7S08FU | 0801-000794 | |
| U404 | IC-CMOS LOGIC, TC7S04FU | 0801-002345 | |
| U412 | IC-EEPROM, X24645S8I | 1103-001084 | |
| U203 | IC-OP AMP, LM7131ACM5 | 1201-001018 | |
| U411 | IC-OP AMP, TLV2264AIPWLE | 1201-001289 | |
| U202 | IC-POWER AMP, PF01411B | 1201-001299 | |
| U400 | IC-DC/DC CONVERTER, LTC1555IGN | 1203-001289 | |
| U402 | IC-DC/DC CONVERTER, TEA1204T | 1203-001402 | |
| U307, U406 | IC-VOLTAGE REGULATOR, LP2981AIM5-3.0 | 1203-001454 | |
| U846 | IC-RESET, RN5VD27CA-TR | 1203-001548 | |
| U408 | IC-KERNEL, VP40524B2 | 1205-001327 | |
| U405 | IC-VOCODER, VP40506B4 | 1205-001328 | |
| TH400 | THERMISTOR, 47Kohm, 5%, 4050K, 2.0mW/C, TP | 1404-001005 | |
| R475, R476, R477, R478, R479, R482, R483, R484, R485 | R-CHIP, 100ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000138 | |
| R413, R417 | R-CHIP, 220ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000139 | |
| R218, R223, R419, R420, R426 | R-CHIP, 1Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000140 | |
| R124, R125, R127, R130, R438, R439, | R-CHIP, 2.2Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000141 | |
| R200 | R-CHIP, 2.7Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000142 | |
| R202, R213, R425 | R-CHIP, 4.7Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000143 | |
| R224 | R-CHIP, 8.2Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000147 | |

| LOCATION NO. | DESCRIPTION | SEC CODE | REMARK |
|---|---|---|---|
| R205, R219, R403, R410, R411, R418, R422, R423, R427, R429, R433, R435, R526, R527, R967, R968, R969 | R-CHIP, 10Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000148 | |
| R214 | R-CHIP, 12Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000149 | |
| R216 | R-CHIP, 15Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000151 | |
| R215 | R-CHIP, 22Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000153 | |
| R217, R440, R442, R474 | R-CHIP, 47Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000157 | |
| R424 | R-CHIP, 56Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000159 | |
| R400, R401, R402, R421, R428, R430, R432, R434, R436, R437, R441, R500, R964 | R-CHIP, 100Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000162 | |
| R201, R406, R498 | R-CHIP, 0ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000171 | |
| R204, R206, R207, R414, R415, R480, R481 | R-CHIP, 10ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000172 | |
| R455, R457 | R-CHIP, 330Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000758 | |
| R203 | R-CHIP, 39Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-000831 | |
| R220 | R-CHIP, 470ohm, 5%, 1/16W, DA, TP, 1005 | 2007-000932 | |
| R408 | R-CHIP, 560Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-001025 | |
| R211 | R-CHIP, 680ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001119 | |
| R210 | R-CHIP, 30ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001291 | |
| R221, R222 | R-CHIP, 33ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001292 | |
| R208, R209 | R-CHIP, 180ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001307 | |
| R521 | R-CHIP, 820ohm, 5%, 1/16W, DA, TP, 1005 | 2007-001316 | |
| R467, R469, R470, R471 | R-CHIP, 1.2Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-001319 | |
| R464 | R-CHIP, 1.8Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-001320 | |
| R212 | R-CHIP, 3.3Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-001325 | |
| R225 | R-CHIP, 560ohm, 5%, 1/16W, DA, TP, 1005 | 2007-002797 | |
| R446, R463 | R-CHIP, 4.7Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007136 | |
| R473 | R-CHIP, 240ohm, 5%, 1/16W, DA, TP, 1005 | 2007-007141 | |
| R445, R448, R461, R451, R453, R456, R458, R462 | R-CHIP, 10Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007142 | |
| R449, R450, R454, R460, | R-CHIP, 22Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007311 | |
| R443, R452, R459, R468 | R-CHIP, 1Kohm, 1%, 1/16W, DA, TP, 1005 | 2007-007318 | |
| R409 | R-CHIP, 130Kohm, 5%, 1/16W, DA, TP, 1005 | 2007-007480 | |
| R444, R447, R465, R466 | R-CHIP, 470ohm, 1%, 1/16W, DA, TP, 1005 | 2007-007586 | |
| C209, C214, C226, C227, C229, C233, C401, C468, C469, C470, C471, C472 | C-CHIP, 100pF, 5%, 50V, TP, 1005 | 2203-000234 | |

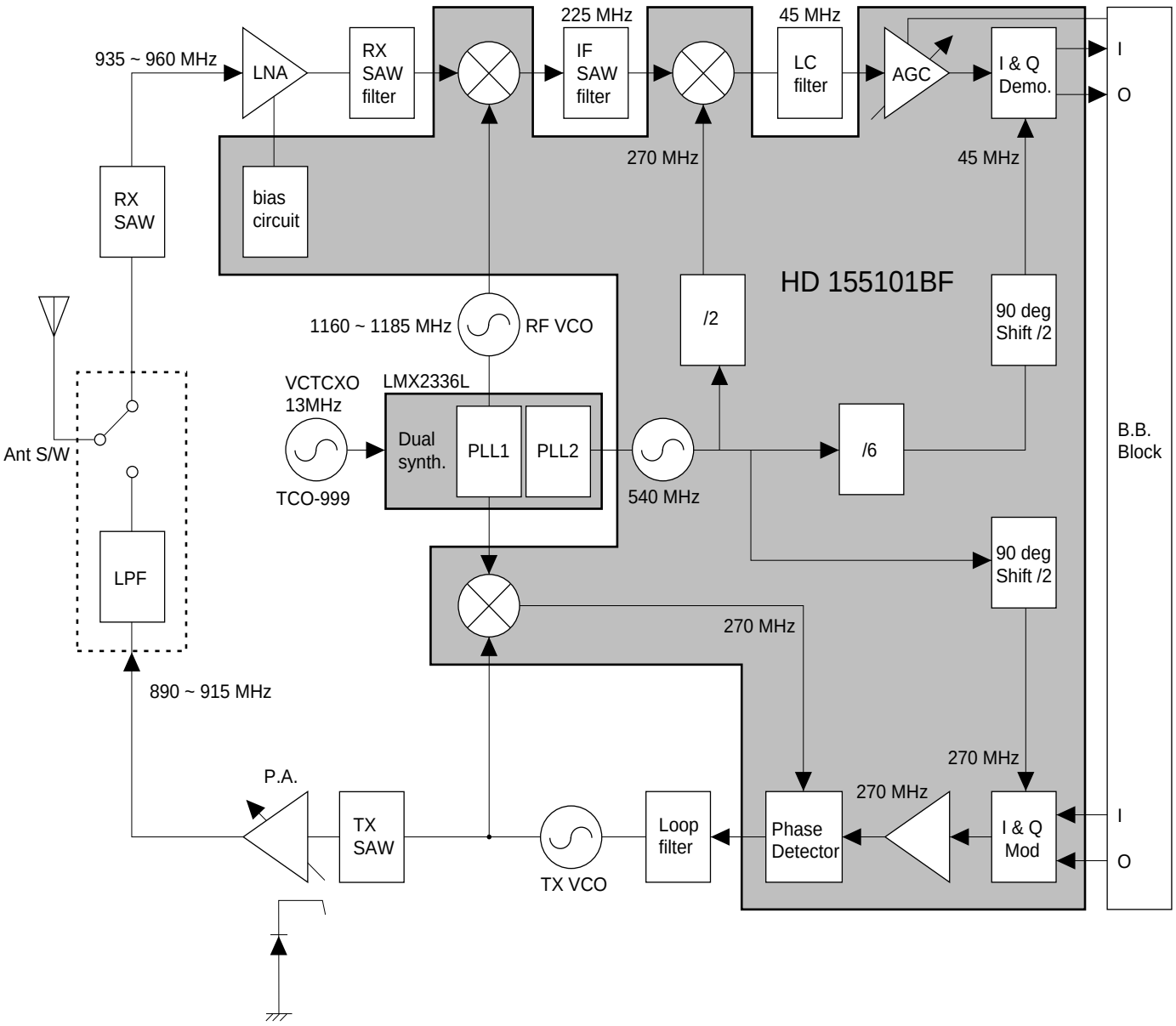
| LOCATION NO. | DESCRIPTION | SEC CODE | REMARK |
|---|---|---|---|
| C107, C200, C201, C202, C206, C207, C215, C315, C405, C419, C421, C422, C423, C427, C428, C438, C440, C441, C442, C458, C462, C950, C971, C972 | C-CHIP, 10nF, 10%, 16V, TP, 1005 | 2203-000254 | |
| C203, C220, C451, C455, C935, C936 | C-CHIP, 1nF, 10%, 50V, TP, 1005 | 2203-000438 | |
| C446, C459 | C-CHIP, 2.2nF, 10%, 50V, TP, 1005 | 2203-000489 | |
| C210 | C-CHIP, 220pF, 10%, 50V, TP, 1005 | 2203-000585 | |
| C213, C956 | C-CHIP, 22pF, 5%, 50V, TP, 1005 | 2203-000628 | |
| C216, C221 | C-CHIP, 27pF, 5%, 50V, TP, 1005 | 2203-000679 | |
| C445, C464 | C-CHIP, 3.3nF, 10%, 50V, TP, 1005 | 2203-000714 | |
| C447, C457 | C-CHIP, 3.9nF, 10%, 50V, TP, 1005 | 2203-000725 | |
| C208, C219, C223, C225, C224, C943 | C-CHIP, 33pF, 5%, 50V, TP, 1005 | 2203-000812 | |
| C444, C463 | C-CHIP, 5.6nF, 10%, 25V, TP, 1005 | 2203-001033 | |
| C212, C453 | C-CHIP, 820pF, 10%, 50V, TP, 1005 | 2203-001221 | |
| C205 | C-CHIP, 8pF, 0.5pF, 50V, TP, 1005 | 2203-001259 | |
| C424, C431, C434, C450, C452 | C-CHIP, 47nF, 10%, 16V, TP, 1005 | 2203-001432 | |
| C204 | C-CHIP, 75pF, 5%, 50V, TP, 1005 | 2203-001441 | |
| C448, C449, C454, C456 | C-CHIP, 330pF, 10%, 50V, TP, 1005 | 2203-002443 | |
| C460 | C-CHIP, 560pF, 10%, 50V, TP, 1005 | 2203-002525 | |
| C406, C429 | C-CHIP, 150nF, +80-20%, 16V, TP, 1608 | 2203-005015 | |
| C218 | C-CHIP, 3.3pF, 0.25pF, 50V, TP, 1005 | 2203-005052 | |
| C435, C439, C461, C465, C466, C467 | C-CHIP, 100nF, +80-20%, 16V, TP, 1005 | 2203-005061 | |
| C230, C311, C413, C414, C415, C418, C420, C436 | C-CHIP, 1uF, +80-20%, 10V, TP, 1608 | 2203-005065 | |
| C933 | C-CHIP, 10uF, +80-20%, 10V, | 2203-005437 | |
| C941 | C-CHIP, 220nF, +80-20%, 16V, TP, 1005 | 2203-005496 | |
| C430 | CAP-TANTAL, 47uF, 20%, 6.3V, 3528 | 2404-001039 | |
| C314, C409, C410, C437 | CAP-TANTAL, 10uF, 20%, 6.3V, 2012 | 2404-001064 | |
| C228, C404 | CAP-TANTAL, 220uF, 20%, 6.3V, 7125 | 2404-001083 | |
| C942 | CAP-TANTAL, 4.7uF, 20%, 6.3V, 2012 | 2404-001086 | |
| L402, L404 | Inductor, 1000uH, 20%, 1210-ac13225 | 2703-000153 | |
| L205, L206 | Inductor, 10nH, 5%, 1608 | 2703-001040 | |
| L207 | Inductor, 4.7nH, 10%, 1608 | 2703-001165 | |
| L200, L203 | Inductor, 18nH, 5%, 1608 | 2703-001189 | |
| L201, L202 | Inductor, 82nH, 5%, 1608 | 2703-001293 | |

| LOCATION NO. | DESCRIPTION | SEC CODE | REMARK |
|---|---|---|---|
| L401, L403 | Inductor, 680uH, 20%, 3225 | 2703-001417 | |
| L204 | Inductor, 100nH, 5%, 1608 | 2703-001513 | |
| L208 | Inductor, 33nH, 5%, 1608 | 2703-001543 | |
| L400 | Inductor, 22uH, 20%, 6.0x6.0x2.9mm | 2703-001683 | |
| U201 | VCTCXO, TCO-999 | 2809-001212 | |
| F200 | FILTER-SAW, FAR-F5CJ-947M50-L213 | 2904-001094 | |
| F201 | TX SAW FILTER, SAFC902.5MC90T-TC11 | 2904-001118 | |
| U204 | IC-SWITCH, LMS30L0897H103 | 2909-001072 | |
| FB100 | FERITE BEAD, BLM31P500SPT | 3301-001177 | |
| J400 | SIM CONNECTOR, 2-338063-2 | 3709-001088 | |
| M400 | VIBRATOR CONNECTOR, 24-8005-002-000-007 | 3710-001105 | |
| J401 | IF CONNECTOR, MQ/S179-SAA-18P/4 | 3710-001302 | |
| J1001 | EARPHONE JACK, 02-699B0-53BKA | 3722-001303 | |
| U205 | COUPLER, DCS314E | 4709-001124 | |
| R472, R407, C400, R971, C940, C407, C443, C217, C222, C211 | | N.C POINT | |
| A100 | ANTENNA, 70183.1 | GH42-10523A | |

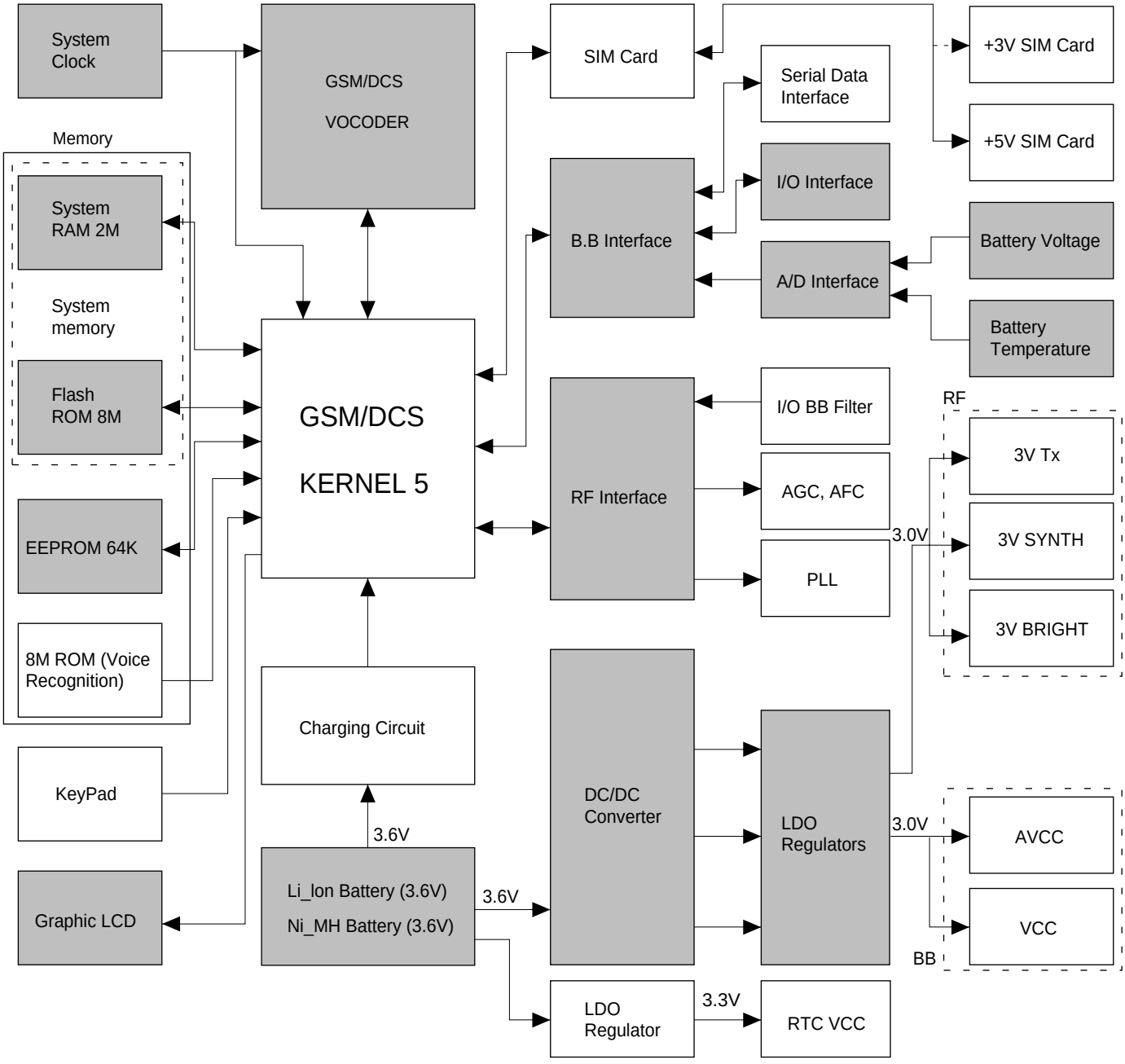
MEMO

# 9. Block Diagram

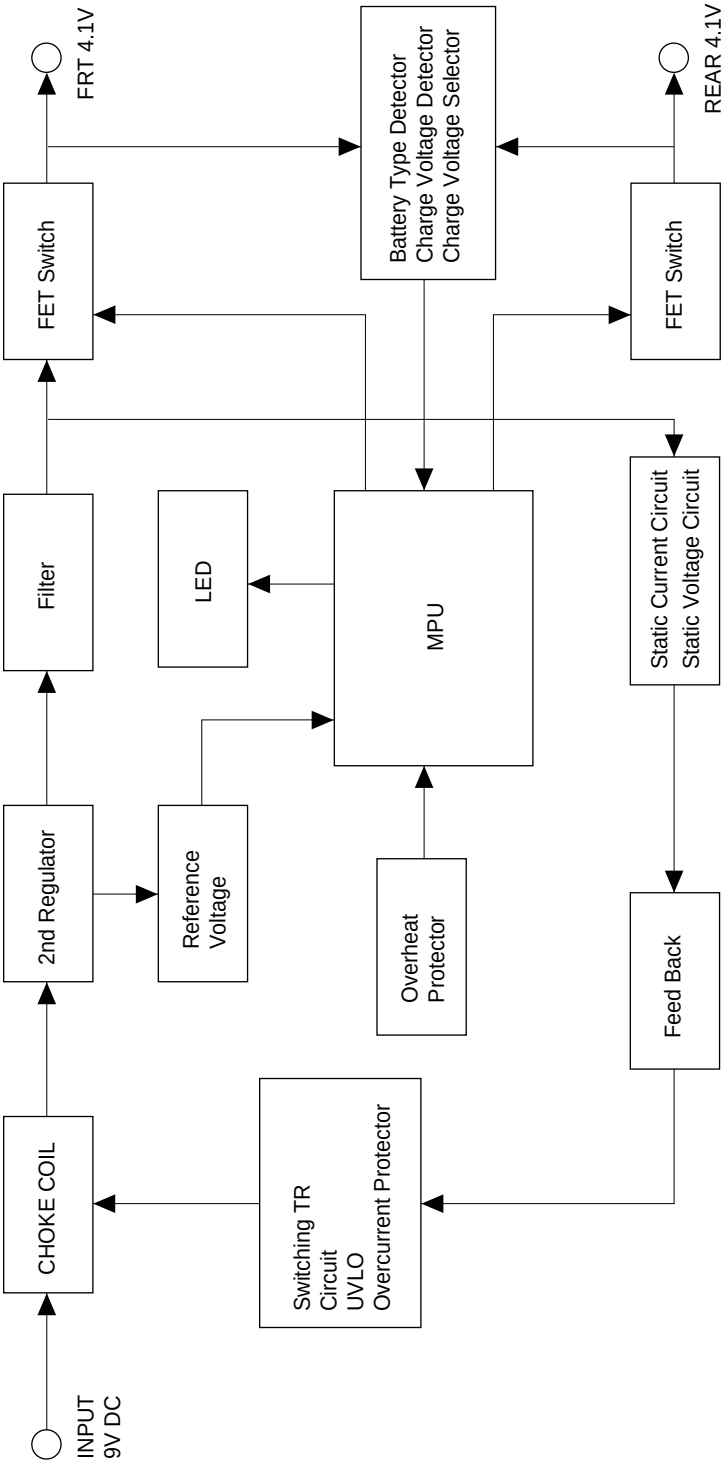
## 9-1 RF Block Diagram



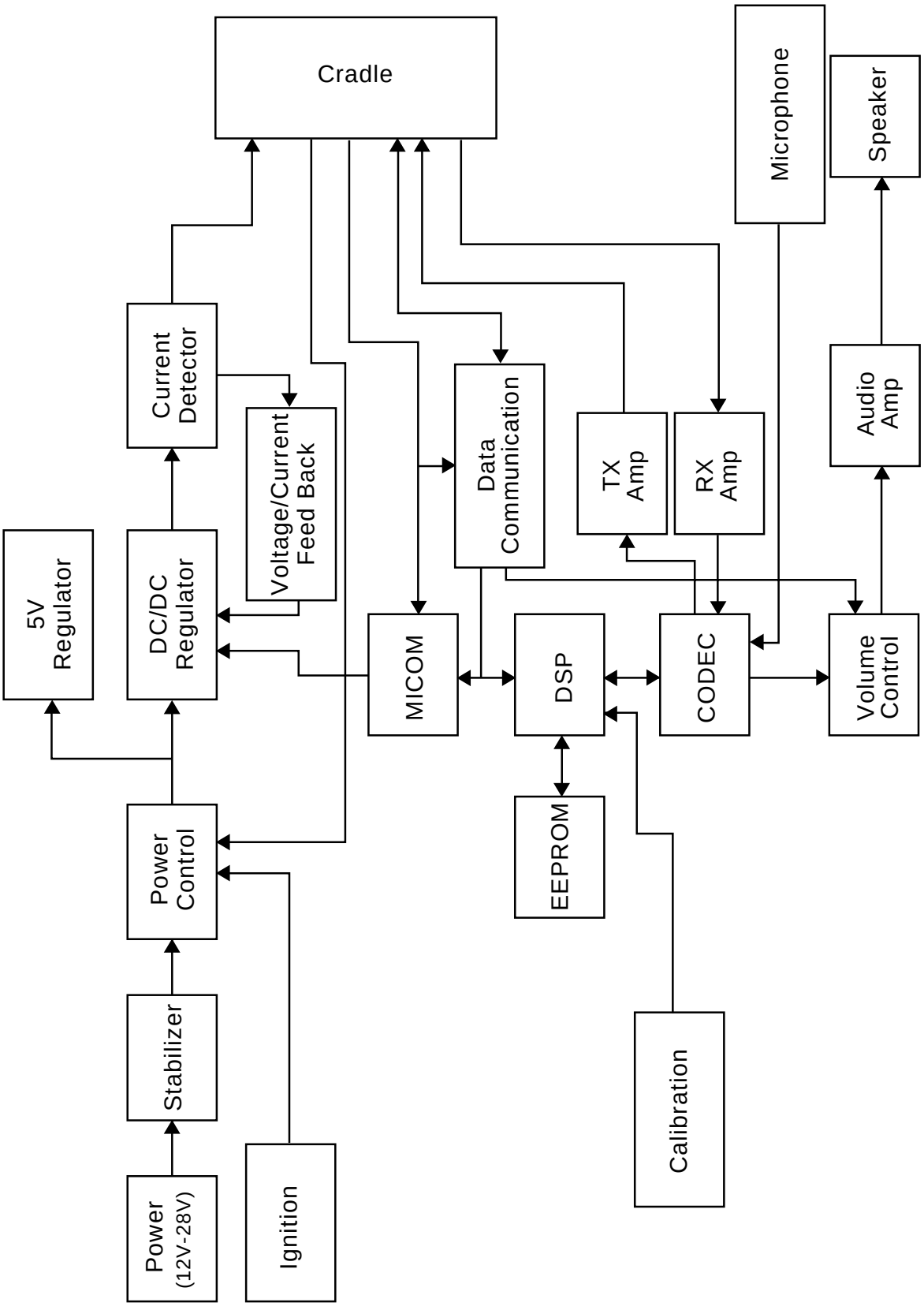
## 9-2 Baseband Block Diagram

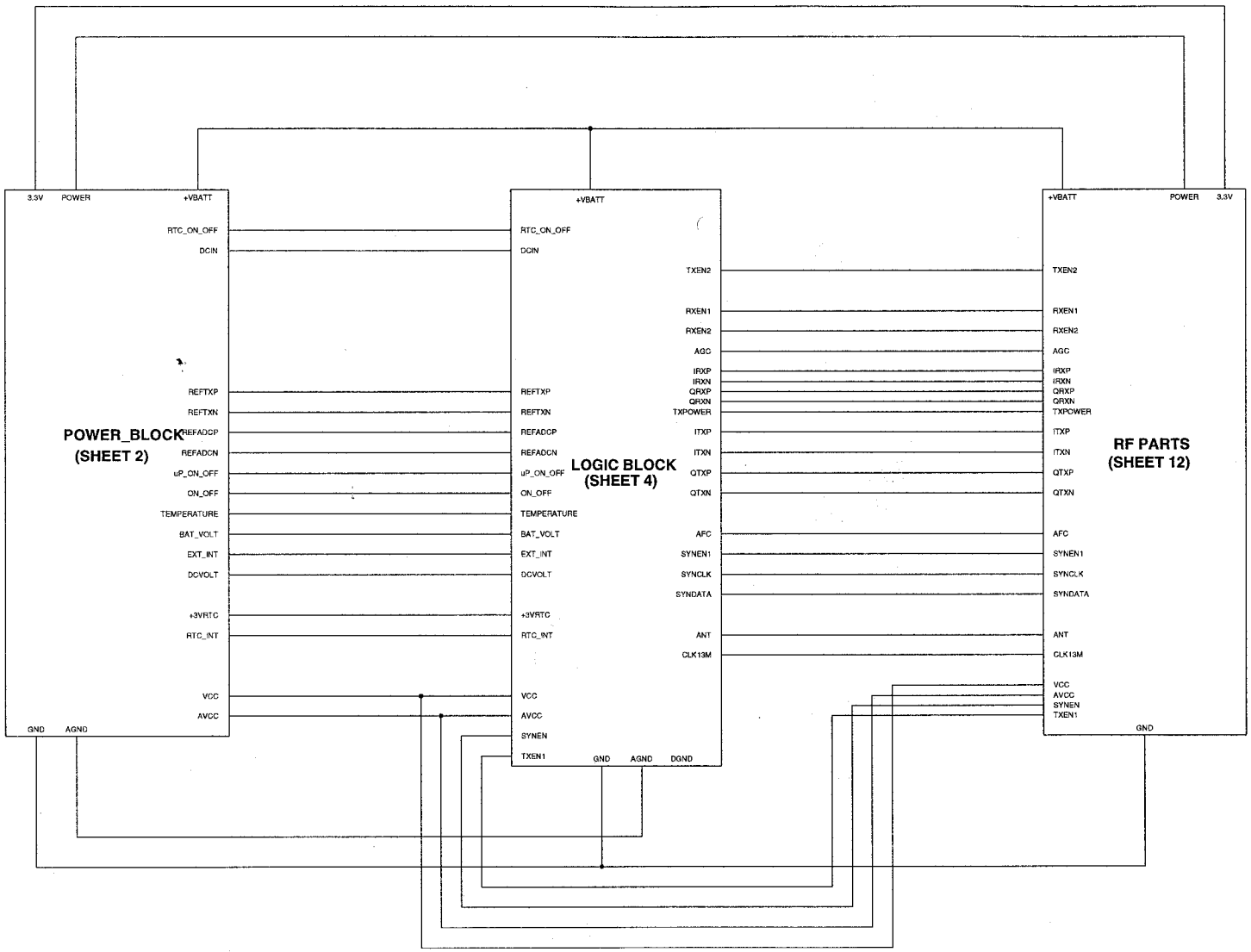


## 9-3 DTC Block Diagram

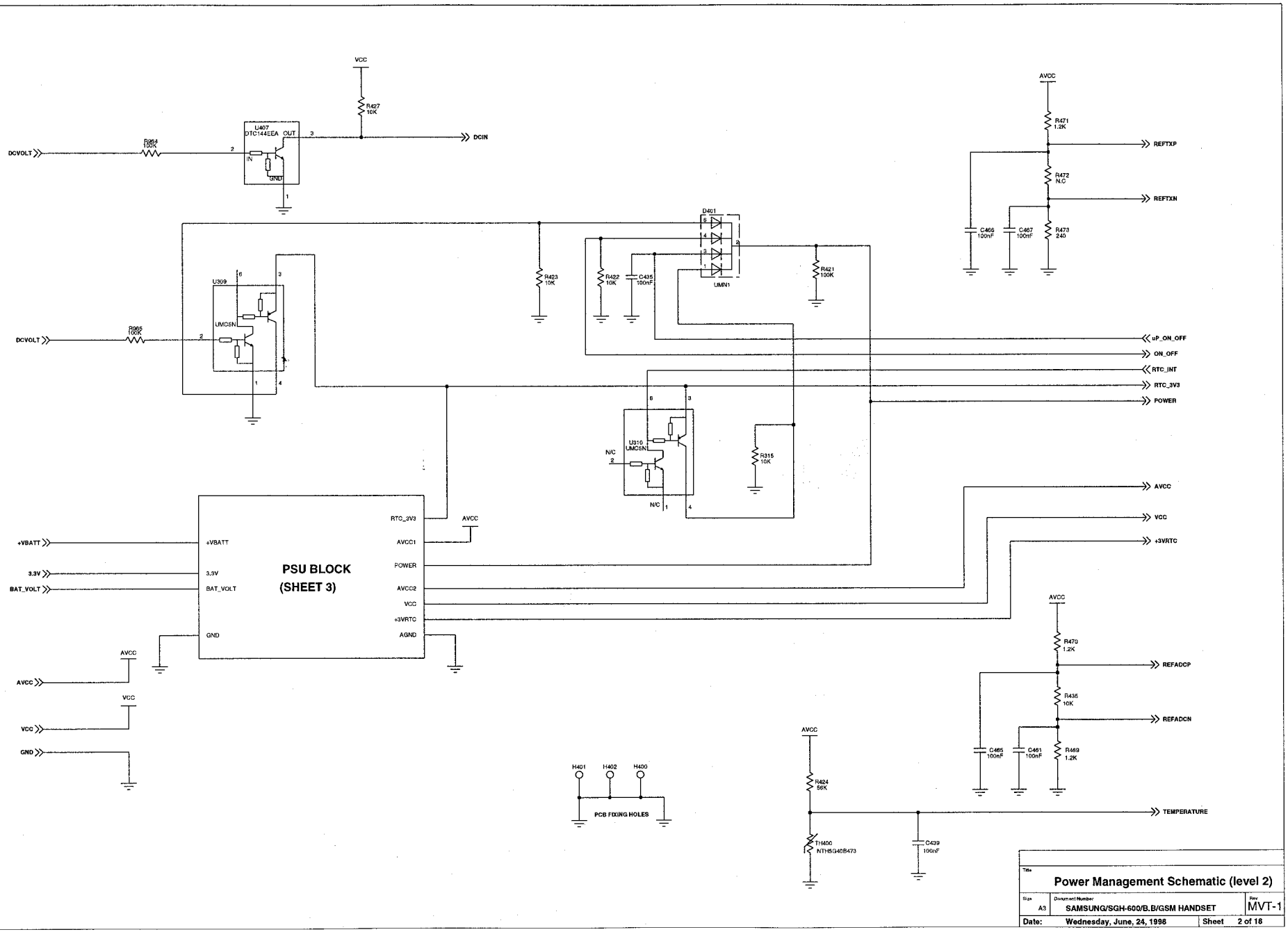


## 9-4 HFK Block Diagram

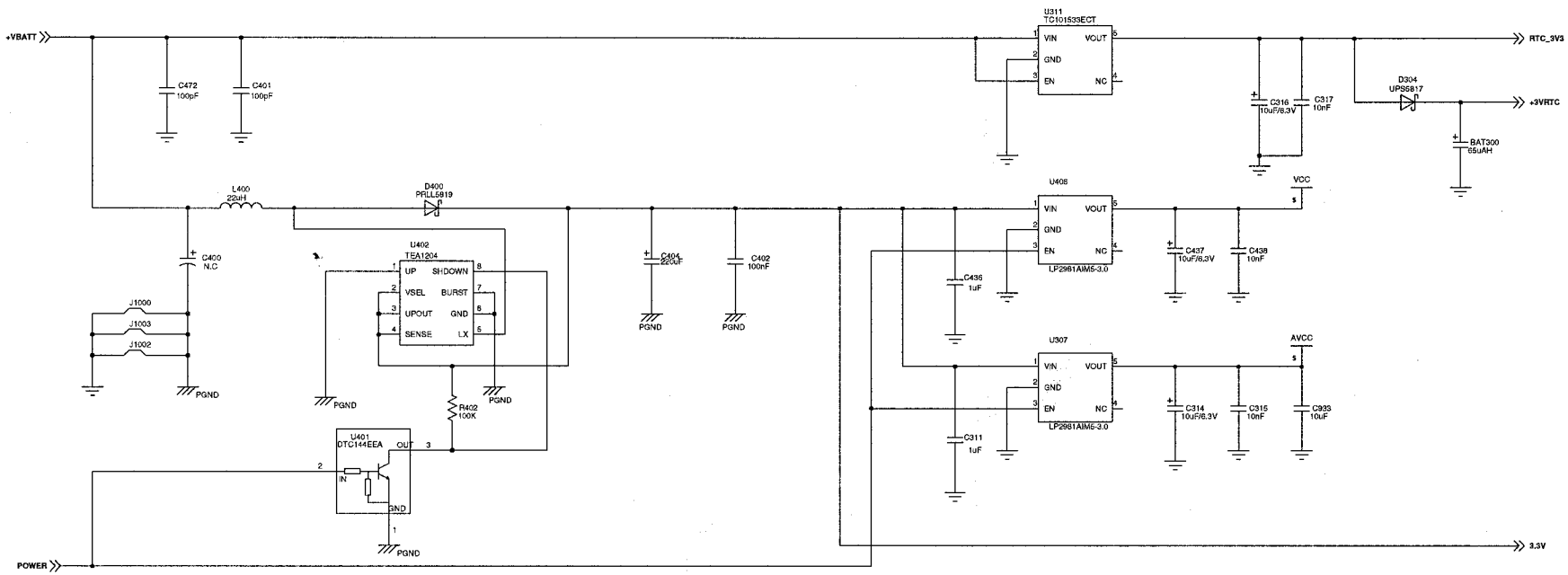




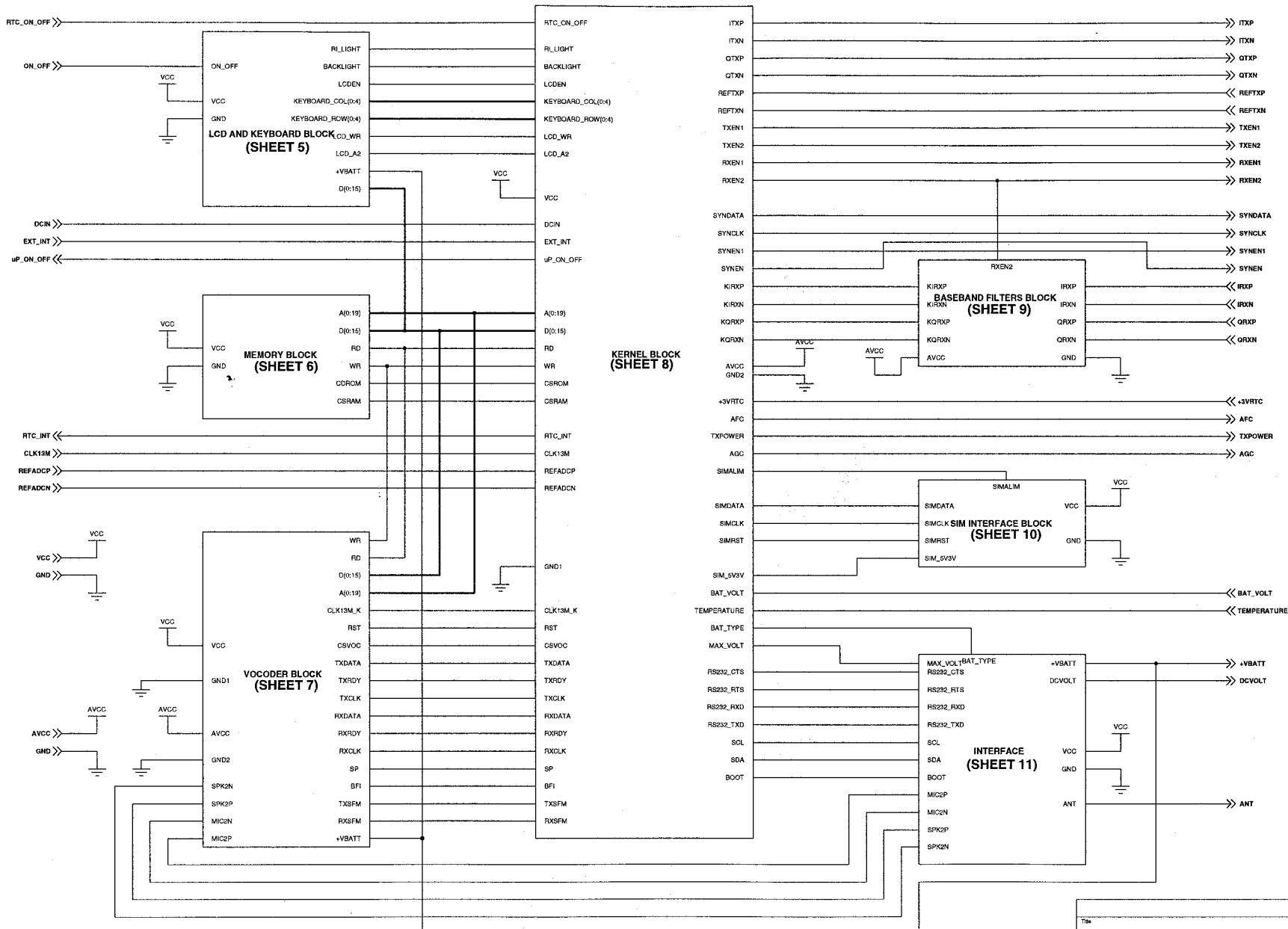

| | | |
|---|---|---|
| Title: GSM Handset Schematic (Top Level) | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/GSM HANDSET | Rev: Rev4.0 |
| Date: Monday, Sep, 14, 1998 | Sheet 1 of 18 | |




| | | |
|---|---|---|
| Title | Power Management Schematic (level 2) | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/GSM HANDSET | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1996 | Sheet 2 of 16 | |

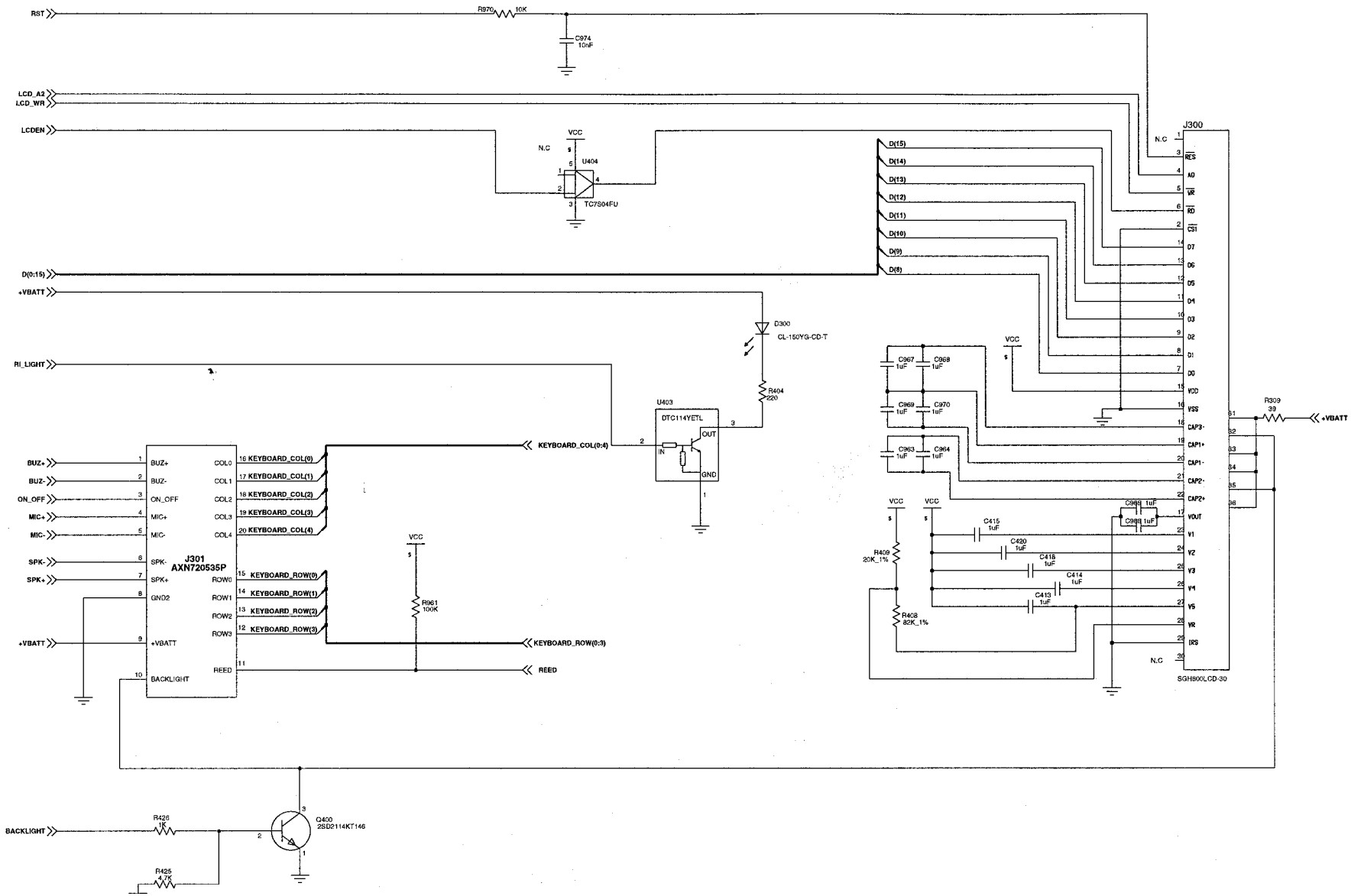



| | | |
|---|---|---|
| Title: PSU Schematic | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/PSU | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 3 of 18 | |

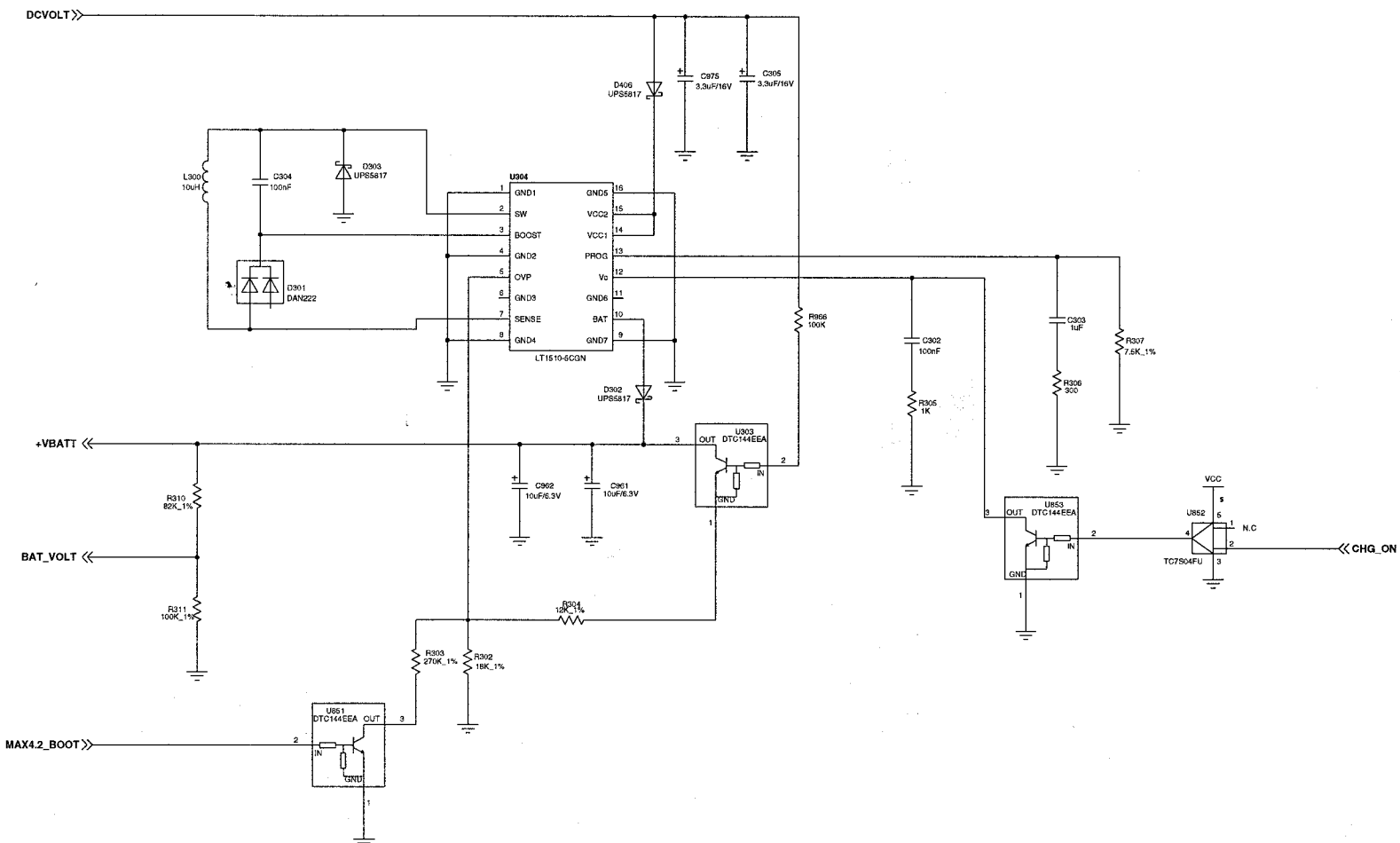



Title: **Logic Schematic (level 2)**

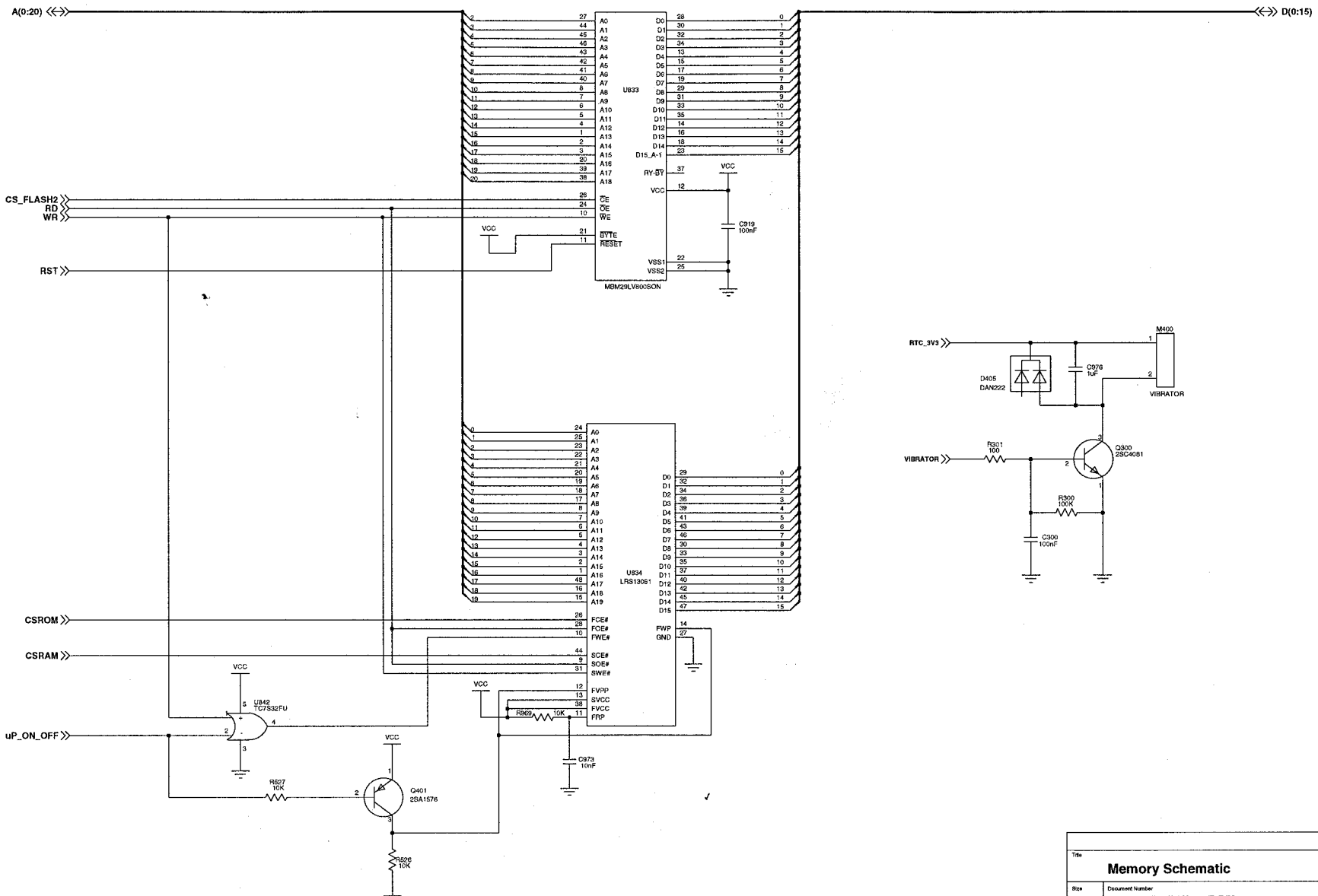
| Size | Document Number | Rev |
|---|---|---|
| A3 | SAMSUNG/SGH-600/B.B/Logic | MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 4 of 18 | |



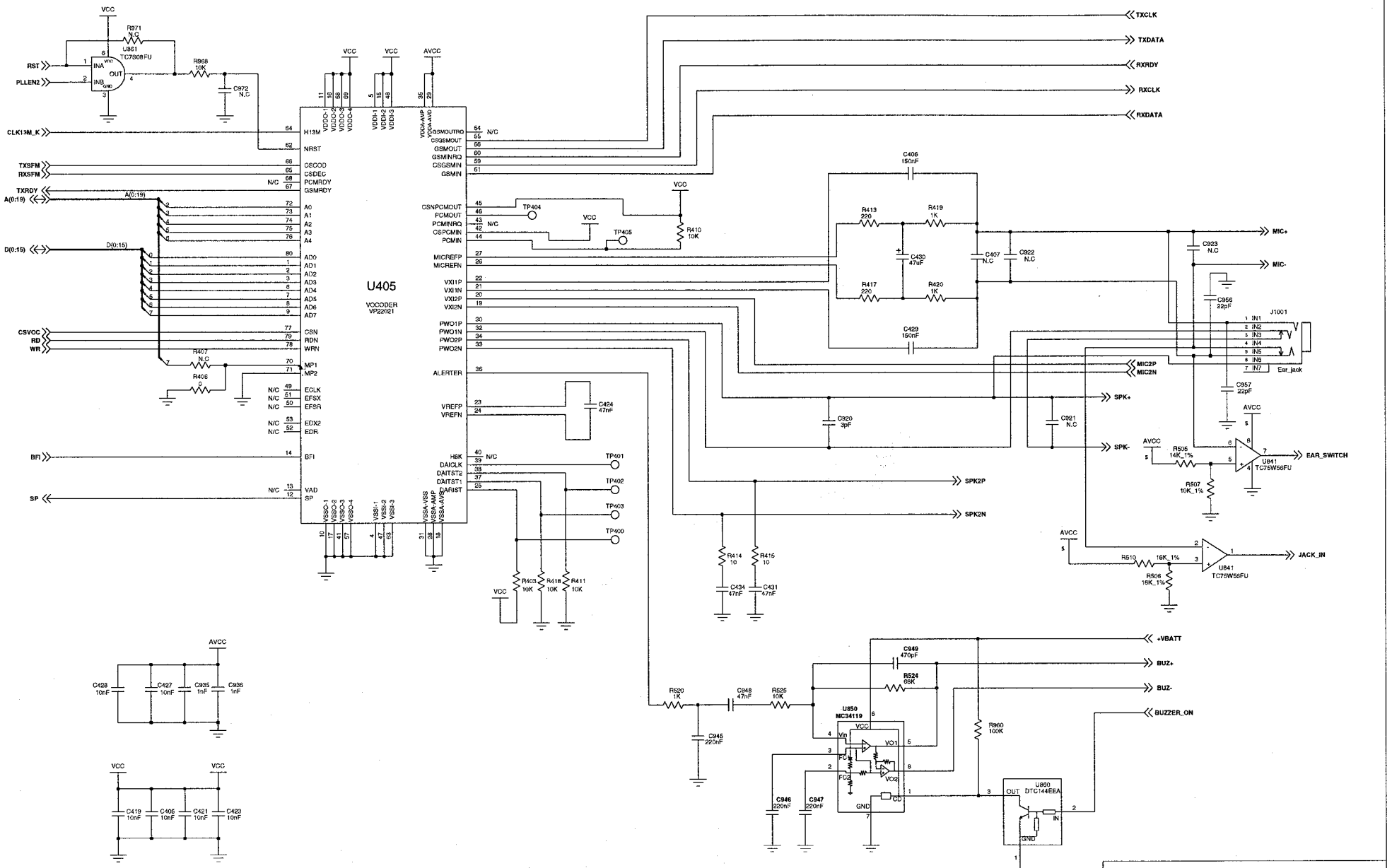

| | | |
|---|---|---|
| Title: LCD Schematic | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/LCD | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 5 of 18 | |




| | | |
|---|---|---|
| Title: **Charger Schematic** | | |
| Size: A3 | Document Number: **SAMSUNG/SGH-600/B.B/CHARGER** | Rev: MVT-1 |
| Date: **Wednesday, June, 24, 1998** | Sheet **6 of 18** | |

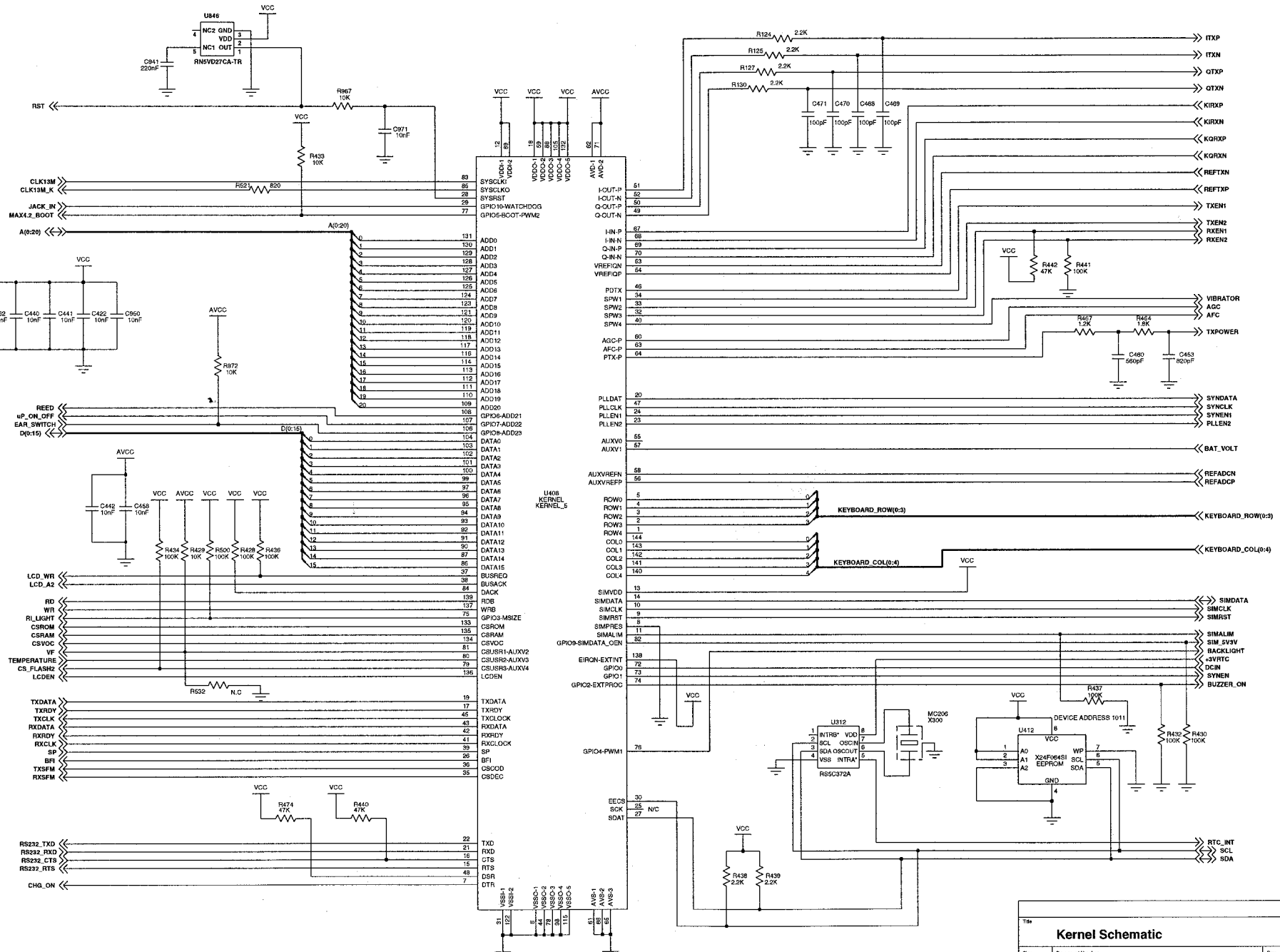



| | | |
|---|---|---|
| Title | **Memory Schematic** | |
| Size: A3 | Document Number: **SAMSUNG/SGH-600/B.B/Memory** | Rev: MVT-1 |
| Date: **Wednesday, June, 24, 1998** | Sheet **7 of 18** | |

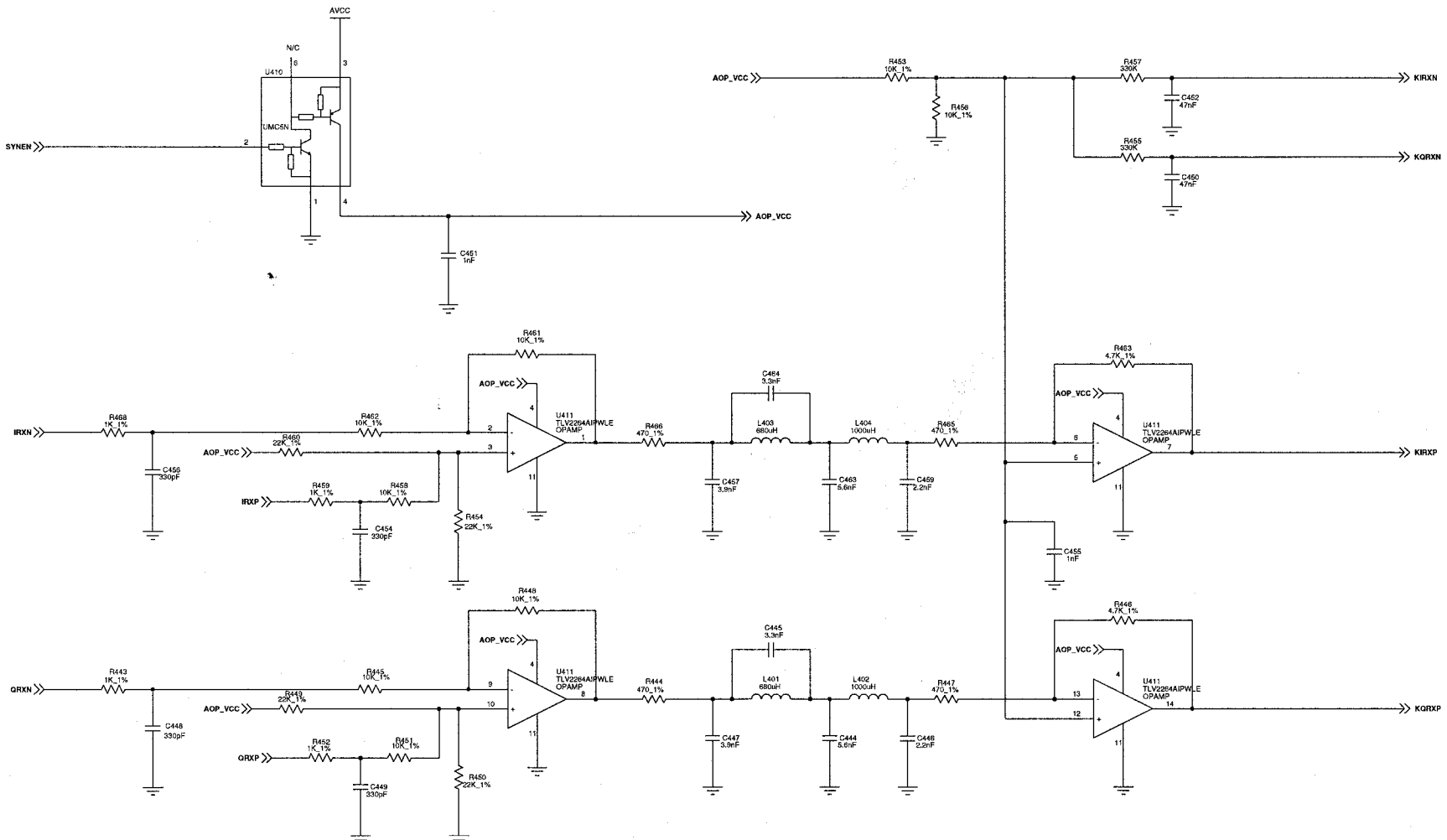



# Vocoder Schematic

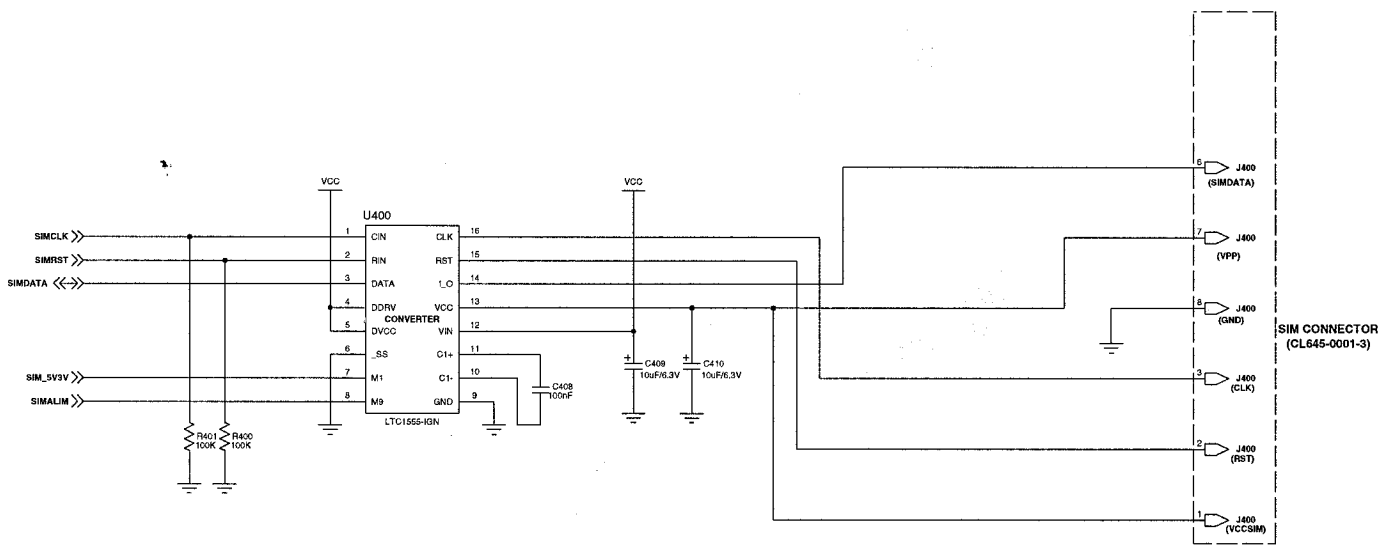
| | | |
|---|---|---|
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/Vocoder | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 8 of 18 | |



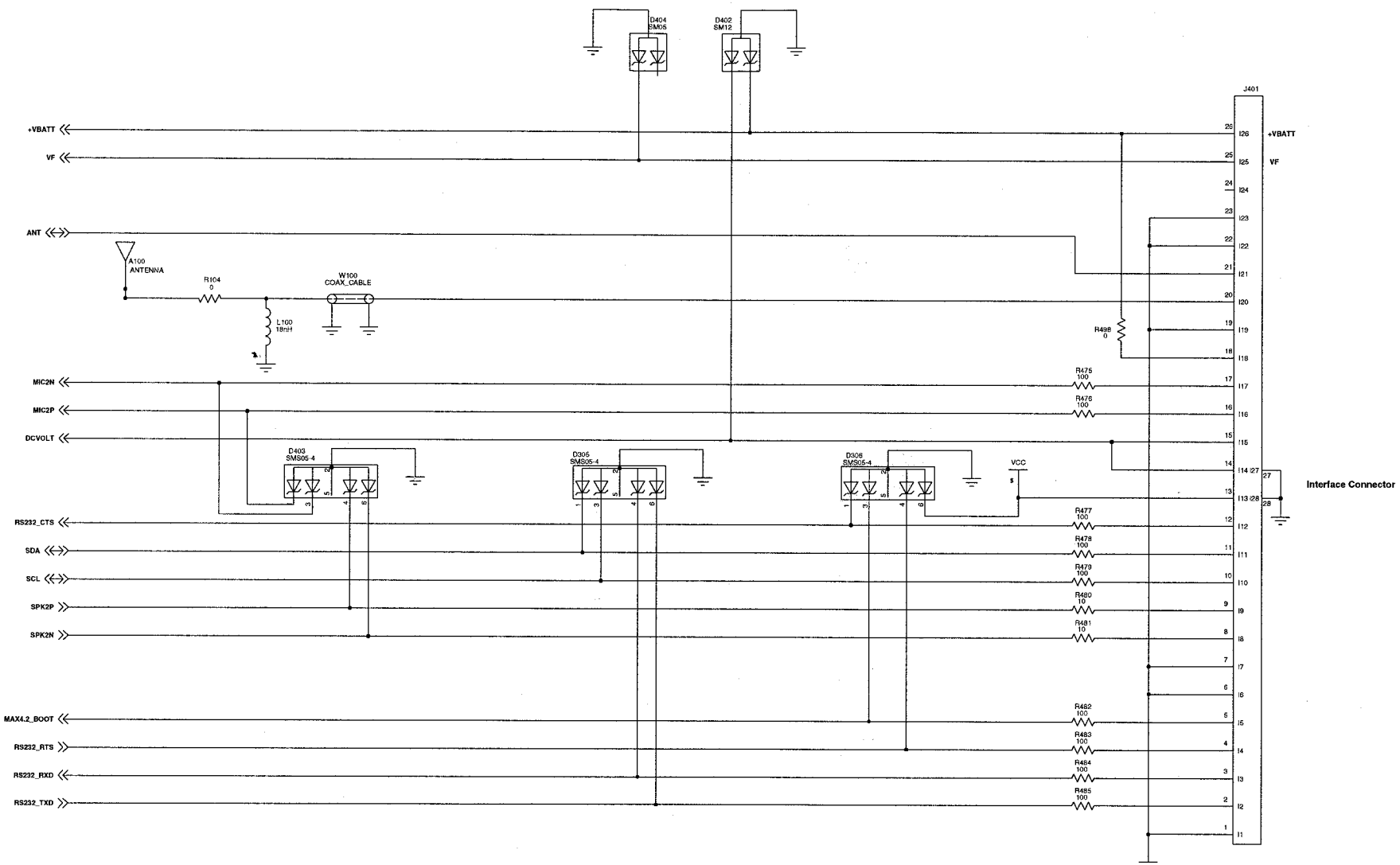

| | | | |
|---|---|---|---|
| Title | Kernel Schematic | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/Kernel | | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | | Sheet 9 of 18 | |



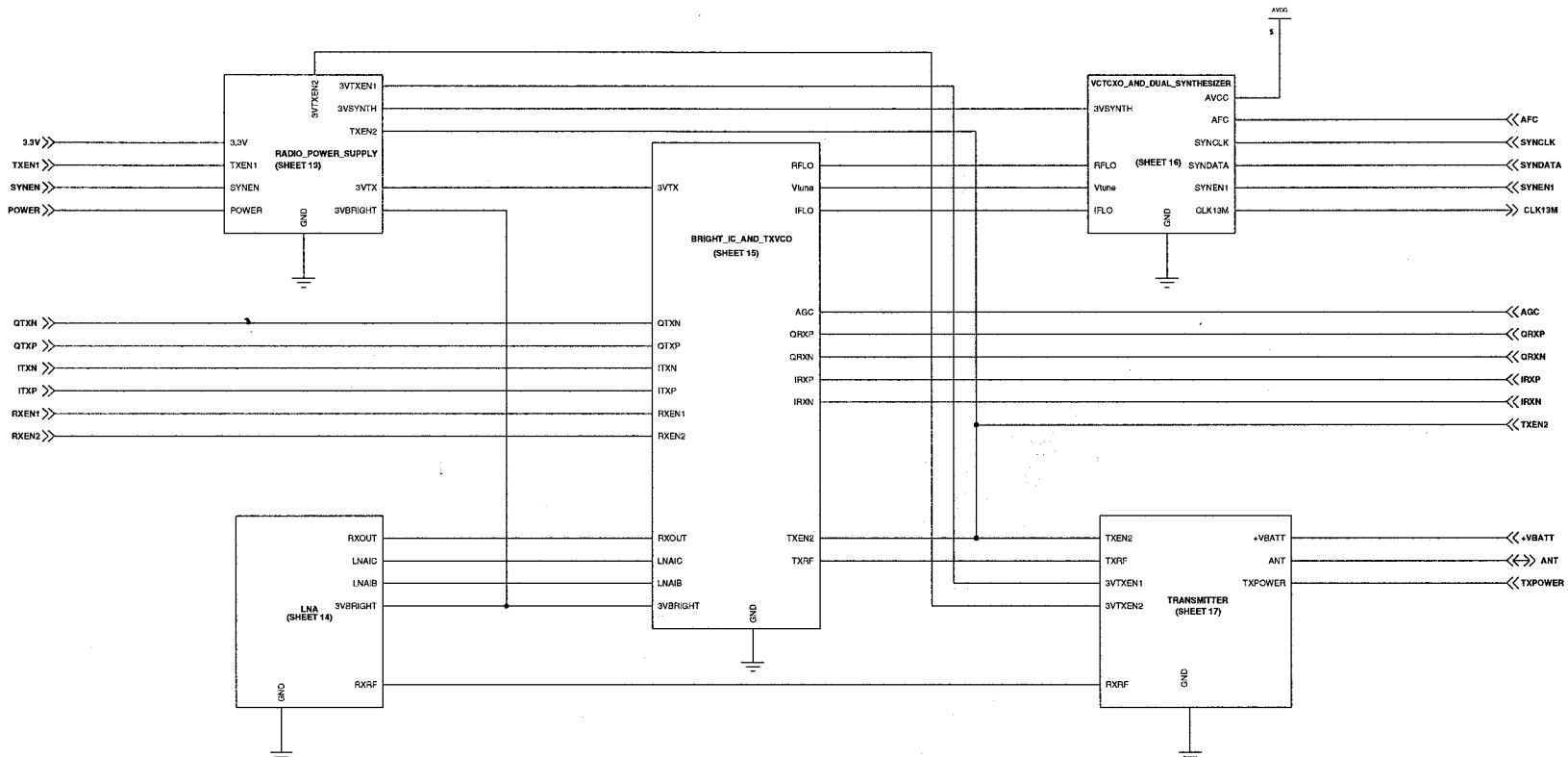

| | | |
|---|---|---|
| Title: **Baseband Filters Schematic** | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/Filters | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 10 of 18 | |



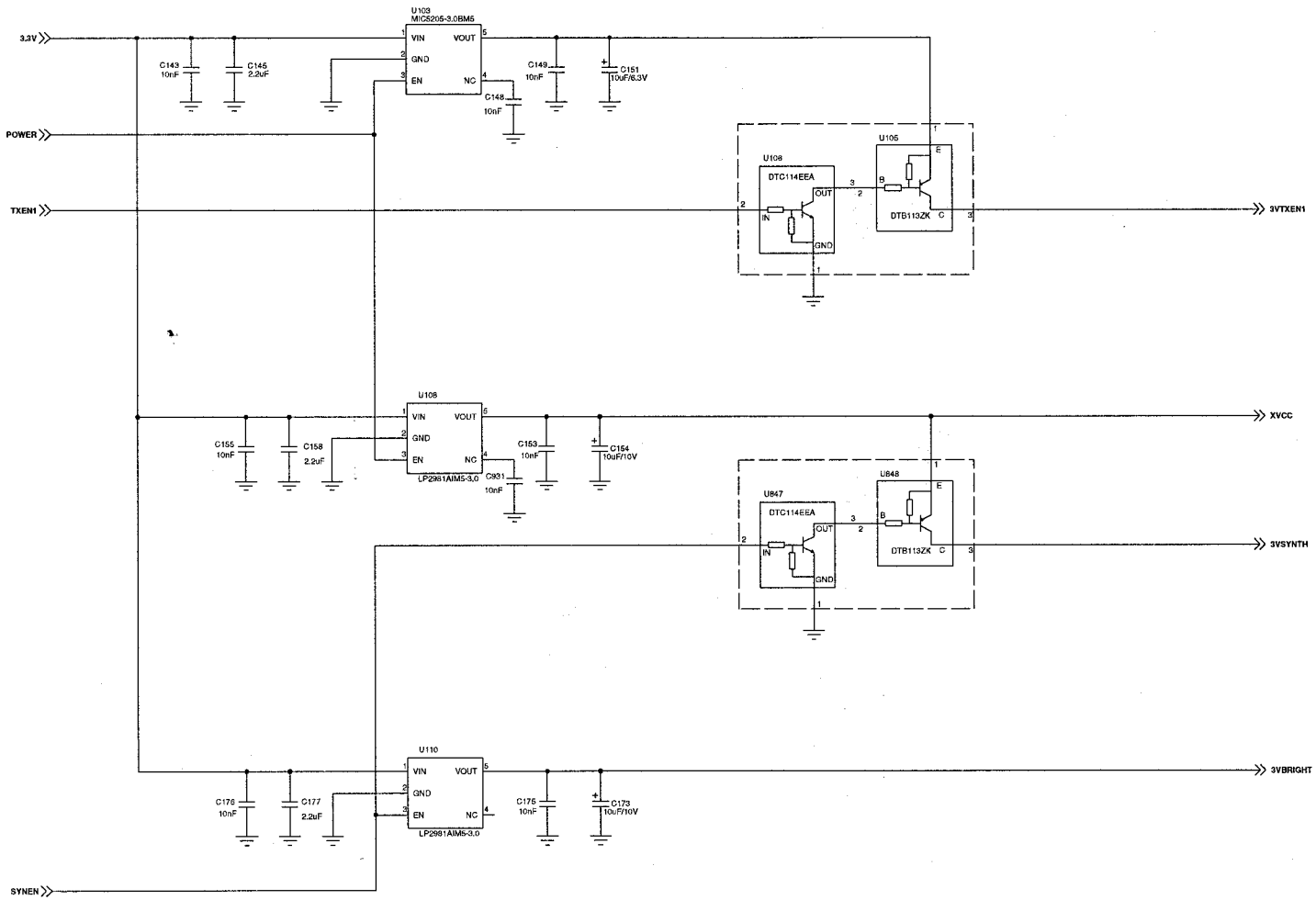

| | | |
|---|---|---|
| Title: Sim Interface Schematic | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/SIM Interface | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet: 11 of 18 | |



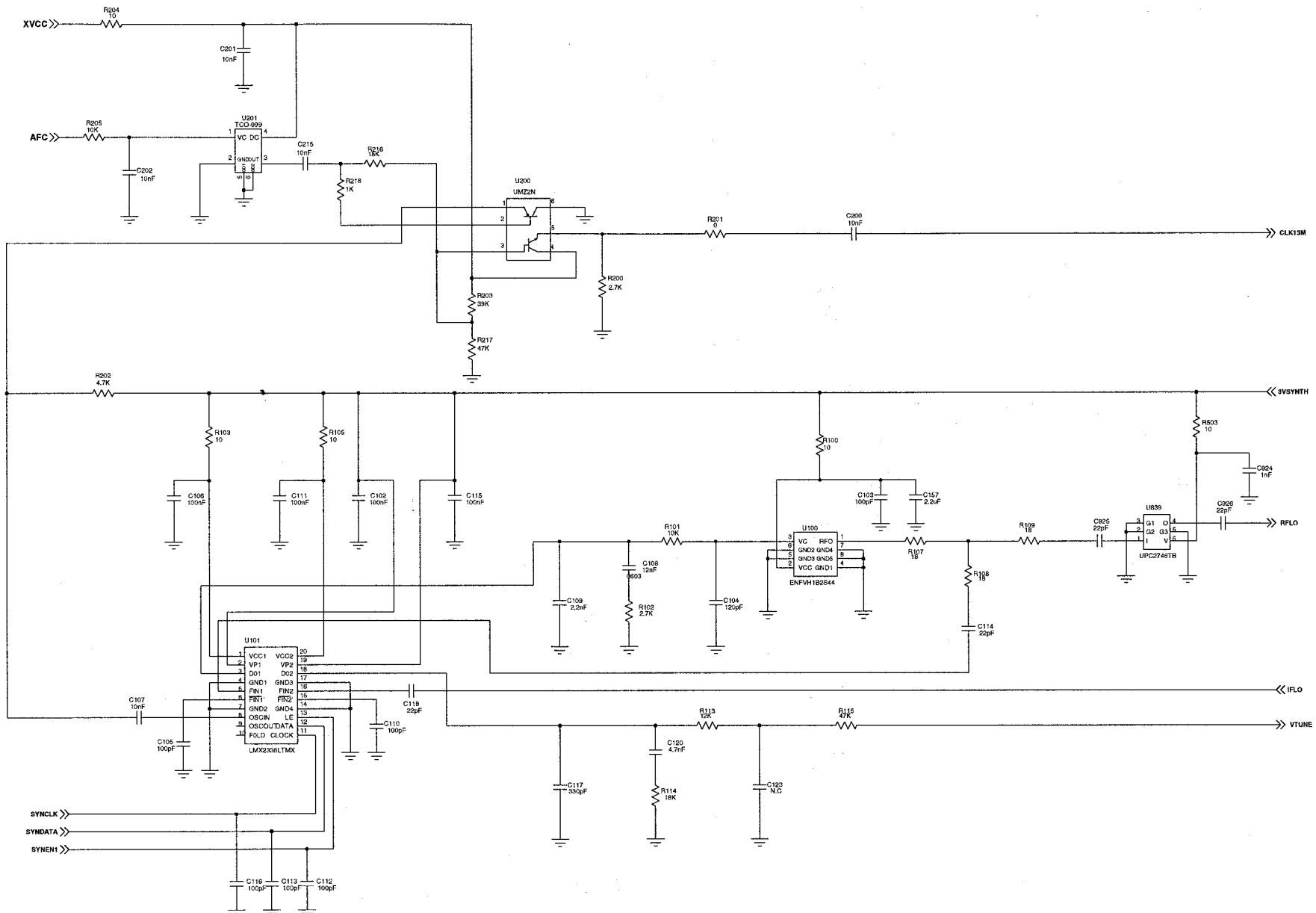

| | | | |
|---|---|---|---|
| Title: **Interface Connector Schematic** | | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/B.B/Interface Connector | | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | | Sheet 12 of 18 | |



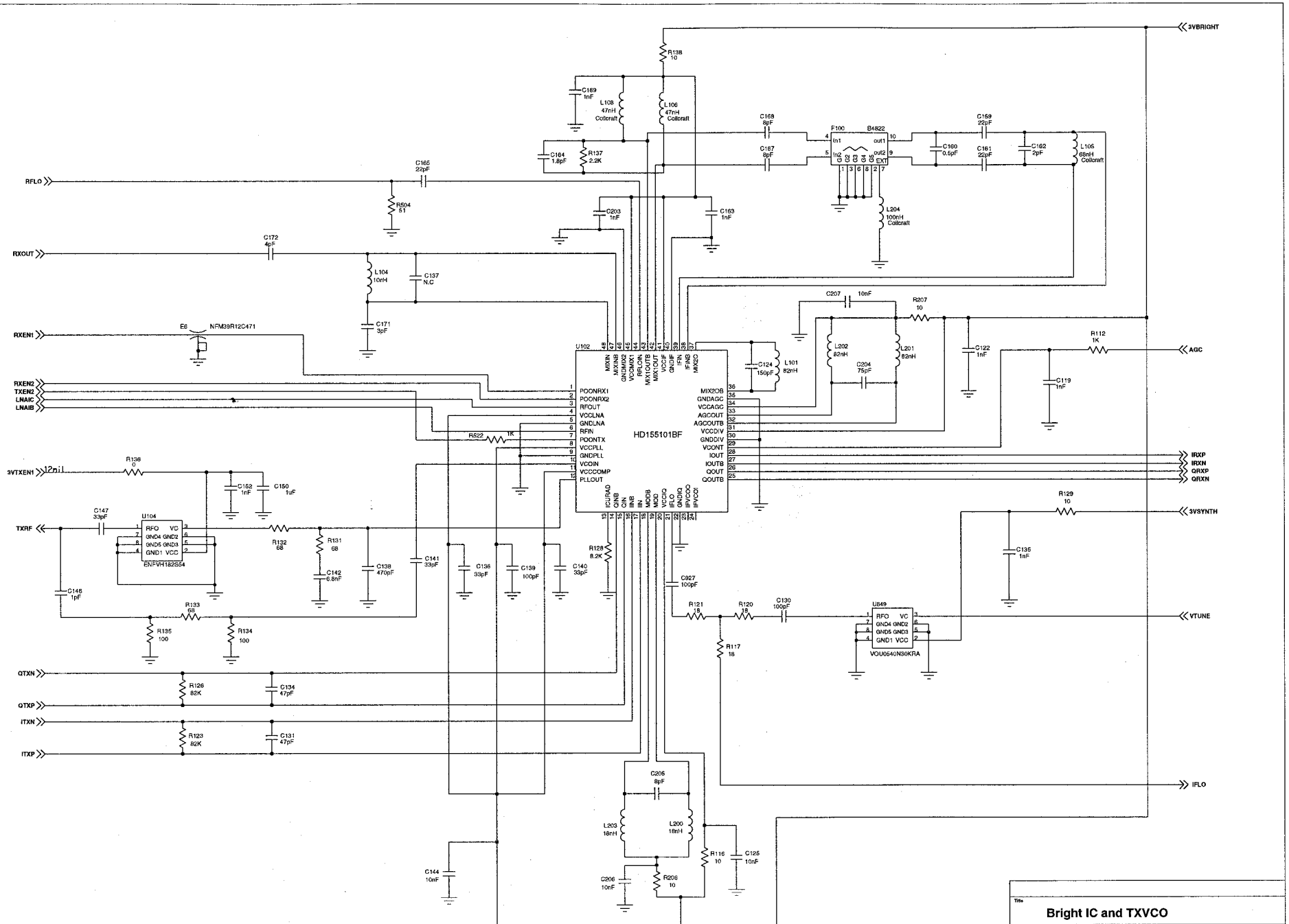

| | | |
|---|---|---|
| Title: RF TOP BLOCK | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/RF/RF TOP | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 13 of 18 | |




| | | |
|---|---|---|
| Title: **Radio Power Supply** | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/RF/Radio Power Supply | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 14 of 18 | |

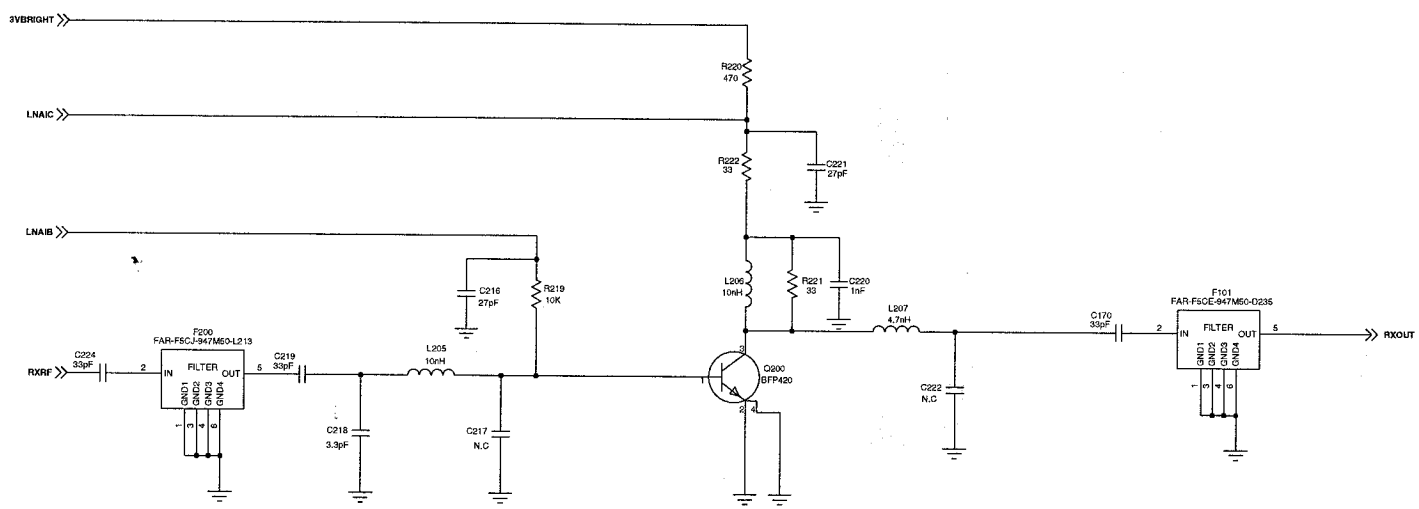



| | | |
|---|---|---|
| Title: VCTCXO and Dual Synthesizers | | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/RF/VCTCXO and Dual synthesizers | Rev: DVT-3.1 |
| Date: Wednesday, June, 24, 1998 | Sheet 15 of 18 | |

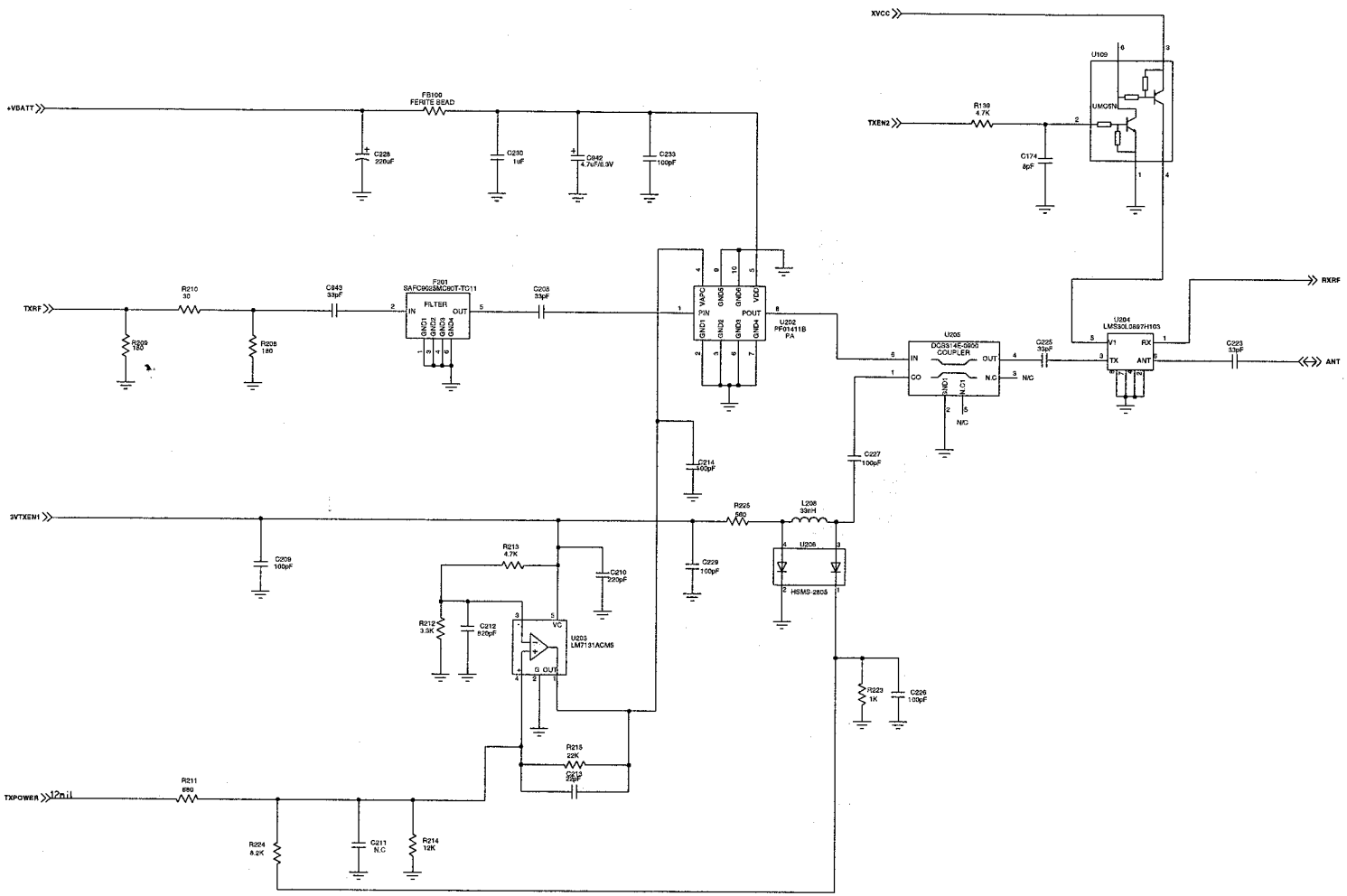



Title: **Bright IC and TXVCO**

| Size | Document Number | Rev |
|---|---|---|
| A3 | SAMSUNG/SGH-600/RF/Bright IC and TXVCO | MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 16 of 18 | |




| | | |
|---|---|---|
| Title | LNA Schematic | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/RF/LNA Part | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 17 of 18 | |




| | | |
|---|---|---|
| Title | **Transmitter** | |
| Size: A3 | Document Number: SAMSUNG/SGH-600/RF/Transmitter | Rev: MVT-1 |
| Date: Wednesday, June, 24, 1998 | Sheet 18 of 18 | |